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DATA BASE FOR POST-FIRE SUCCESSION, FIRST 6 TO 9 YEARS, IN MONTANA LARCH-FIR FORESTS

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RESEARCH SUMMARY

Base line data on species cover ($\text{m}^2/0.01 \text{ ha}$) and volume of space occupied ($\text{m}^3/0.01 \text{ ha}$) for the initial 6 to 9 years of secondary forest succession for western larch-Douglas-fir forests is presented in tabular form for 20 study areas in western Montana. Disturbance treatments include wildfire and clearcutting followed by broadcast slash burning. Treatment conditions include both spring and fall burns (and summer wildfire) on both steep and gentle slopes. In addition, all cardinal exposures are represented over an elevational range from 4,300 to 5,300 feet (1,315 to 1,615 m). Location, physical description, predisturbance stand, and details of disturbance treatment are given for each site.

Information on successional development is presented in this basic form without interpretation to provide a current, quantitative resource for modelers working on forest development and related subjects and as a source for application to other forest management problems where seral changes in vegetation constitute an important planning factor.

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INTRODUCTION

Studies of forest succession in the Northern Rocky Mountains have, for the most part, been reconstructions of community change derived by sampling forest stands of different ages. This approach is a synthetic one that describes forest succession as it is perceived to be, rather than as it is observed to occur. The inherent variability between sites (stands) combined with the fragmentary record of succession time (stand ages) permits only the most generalized characterization of secondary forest succession. Additionally, the lack of a continuous record of change in composition prevents recognition of species development patterns within the succession. This is particularly true for the plants classed as "undergrowth species" (herbs and shrubs) that comprise most of the early seral vegetation.

A fundamental understanding of forest succession requires basic information on the response of component species to disturbance and subsequent successional change. Quantitative data on changes in species abundance through time provide the means for determining adaptations and responses. In most reports of forest succession for our area, the basic quantitative character of the data has been obscured in analytical treatment, and the results are presented in a form that precludes direct application to solving problems on forest wildlands.

Basic successional data has application to many forest wildland management activities. For example, the development of early seral vegetation affects the establishment and survival of planted tree seedlings, the composition and duration of big game browse ranges, the degree of vegetative cover for watershed protection, the production and accumulation of forest fuels, and the characteristics of small mammal and other wildlife habitats. The purpose of this paper is to offer basic data on composition of early seral vegetation, in a form that can be applied to forest management.

These results provide a data base for examining the initial occurrence, response, and development of individual species in terms of their area and volume. Cover (crown area) and aerial crown volume (volume of space occupied) of tree, shrub, and herb components are being sampled annually on permanent plots following prescribed broadcast burning on clearcuts and wildfire in standing timber. The tabular presentation of data represents the first 6 to 9 years of plant succession on 20 experimentally burned units at Miller Creek and Newman Ridge in northwestern Montana.

STUDY AREAS

Fourteen study areas are located at Miller Creek on the Flathead National Forest (48°31' N. latitude, 114°45' W. longitude) 18 miles (29 km) northwest of Whitefish, Montana. The remaining six study areas are at Newman Ridge on the Lolo National Forest (47°15' N. latitude, 115°20' W. longitude) 7 miles (11 km) west of St. Regis, Montana (fig. 1). Elevations at Miller Creek range from 4,300 to 4,950 feet (1,315 to 1,515 m); those at Newman Ridge range from 4,900 to 5,300 feet (1,500 to 1,615 m). The climate of both areas has been characterized by DeByle and Packer (1972) as having long, cool, wet winters and short, relatively dry summers. Annual precipitation averages about 25 inches (64 cm) at Miller Creek and nearly 40 inches (102 cm) at Newman Ridge. About two-thirds of this precipitation falls as snow. Topography at Miller Creek is gentle; the slopes are rounded by ice-sheet glaciation. Here silt-loam soils have developed on glacial till thinly mantled with loess. In contrast, at Newman Ridge slopes are steep. Soils are silt-loam developed on colluvium with a slightly thicker mantle of loess. Forests were predominantly of the larch/Douglas-fir type.

Timber volumes are evenly divided between western larch (*Larix occidentalis*), Douglas-fir (*Pseudotsuga menziesii*) and Engelmann spruce (*Picea engelmannii*). A detailed description of the study areas may be obtained from Beaufait and others (1977) and DeByle and Packer (1972).

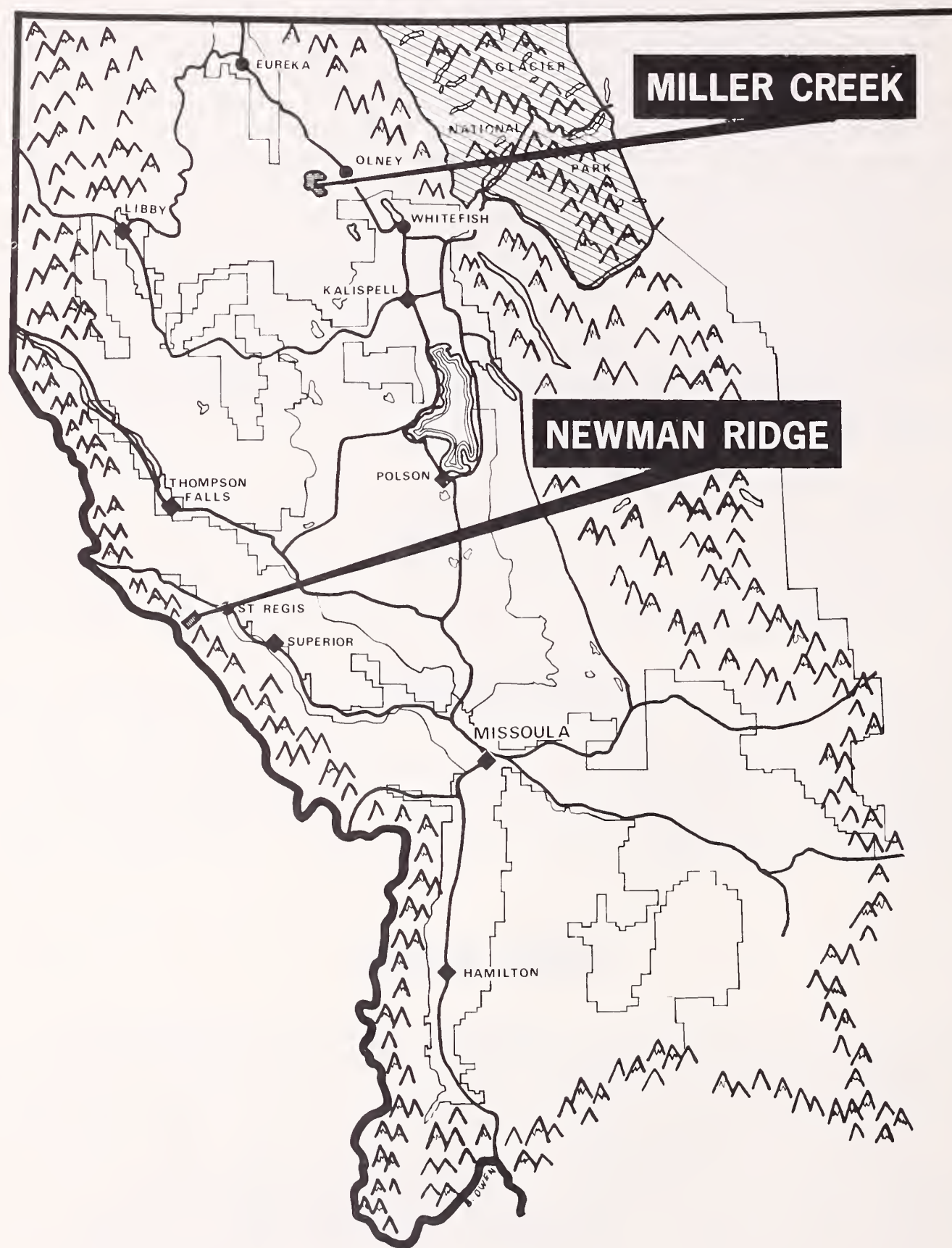


Figure 1.--Study sites on the Flathead and Lolo National Forests in western Montana (Beaufait and others 1977).

Succession study areas were superimposed on units of a study of prescribed burning (Beaufait and others 1977) aimed at relating burn character and accomplishment to fuels and weather. Burning treatments were designed to evaluate the effects of slope, exposure, and season of burning on two types of terrain. Parameters sampled in the fire study were those concerned with pre- and postburn fuels, atmospheric conditions, and burning characteristics of the fire. The units burned, which varied in size from 10 to 58 acres (4 to 23.5 ha), were clearcut-logged and then slashed to provide a uniform fuel bed. Most units were broadcast-burned within 1 year after timber harvest. The usual pattern of firing was to ignite a strip across the upper edge of the block, then the sides, and finally the lower edge. This produced an uphill-heading fire over most of the area. Most units were burned in the late afternoon or early evening. The experimental prescribed burns were conducted during "safe" burning periods, with the exception of three study areas at Miller Creek. In these areas, undisturbed forest vegetation with standing timber was unintentionally burned by a wildfire characteristic of normal burning conditions for late in a dry summer season for the Northern Rocky Mountains. The location of the succession study areas are indicated in figures 2 and 3 by the cross-hatched cutting units.

METHODS

Permanent plots and nondestructive sampling techniques were used to quantify successional development of vascular plants. This approach permits the detection of actual changes in vegetation as they occur over time. Sampling time requirements precluded the establishment of replicates within experimental burning units; thus, succession results may not always be assumed to be representative of the entire unit.

Vegetation Sampled and Plot Layout

The area sampled within a burning unit (10 to 58 acres) (4 to 23.5 ha) consisted of two 5x25-meter transects, each divided into five contiguous 5x5-meter blocks. Each block contains four sizes of nested plots (fig. 4) in which the vegetation is sampled according to height or kind (table 1). Only trees and shrubs were sampled on the three larger plots, 1.5, 3, and 5-meter squares (fig. 5). For trees taller than 2.5 meters, the d.b.h. (at 1.4 m) was measured and recorded by species to the nearest centimeter. Trees less than 2.5 meters, but taller than 1.5 meters, were counted and recorded by species and assigned an assumed diameter of 1.25 cm. Trees from 0.5 to 1.5 meters in height were counted and recorded by species. All shrubs taller than 0.5 meter and trees between 0.5 and 2.5 meters in height were measured individually (to the nearest decimeter) for two horizontal dimensions of the aerial crown and the height from the rooted point.

Herbaceous and low woody plants (including trees and shrubs less than 0.5 m in height) were sampled in two 0.5 x 0.5 meter plots nested within each block (fig. 4). Cover was visually estimated by species in units to the nearest one-sixth of the plot. Species with individual coverages of less than one-sixth were recorded as miscellaneous vegetation for that plot if they collectively totaled one-sixth of the plot area. The remaining ground surface not covered by herbaceous or low woody plants was then similarly classified for cover in order as: (1) moss, (2) litter, (3) rock, or (4) bare ground. Inasmuch as the cover estimates for this plot were designed to equal 100 percent, the cover values of these last four "ground surface" categories reflect only those portions not covered by vascular vegetation. The "representative" height within the plot of each species receiving a cover estimate was measured and recorded to the nearest half decimeter. Occurrence (absolute frequency) was also recorded for each herb and low woody plant species present within this smallest plot.

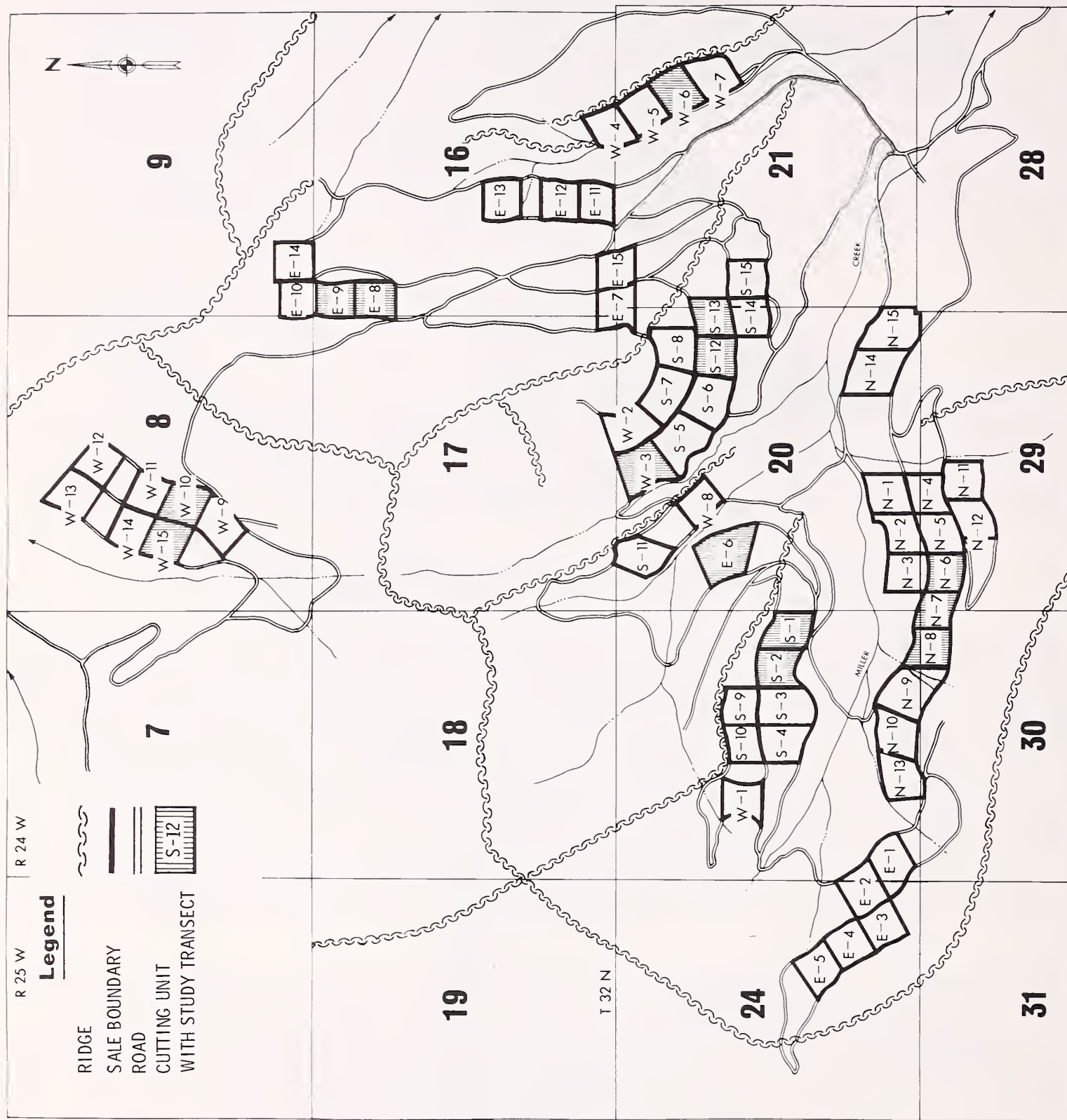


Figure 2.--Miller Creek burning unit layout (Beaufait and others 1977). Cross-hatching designates units containing study areas.

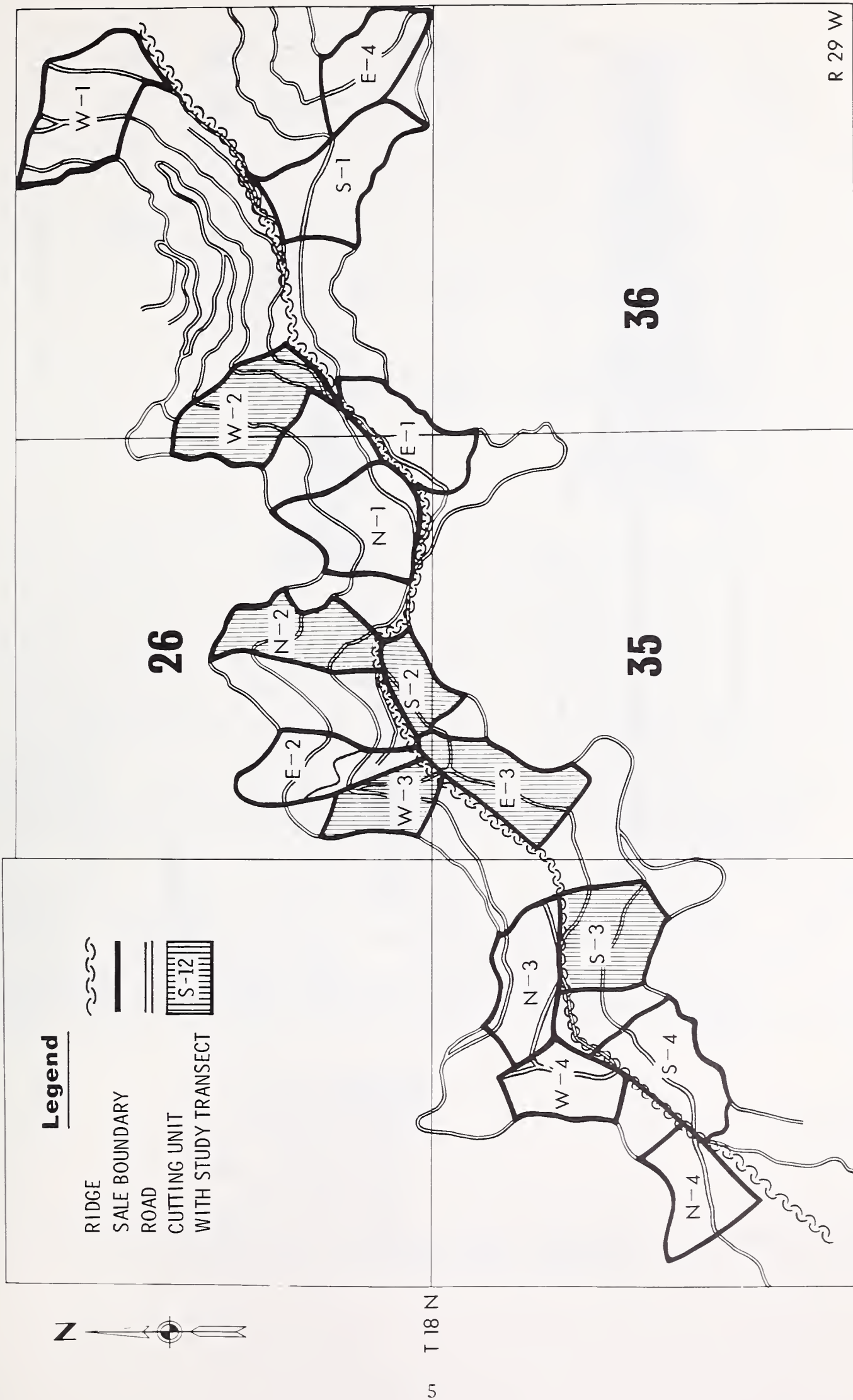


Figure 3.--Newman Ridge burning unit layout (Beaufait and others 1977). Cross-hatching designates units containing study areas.

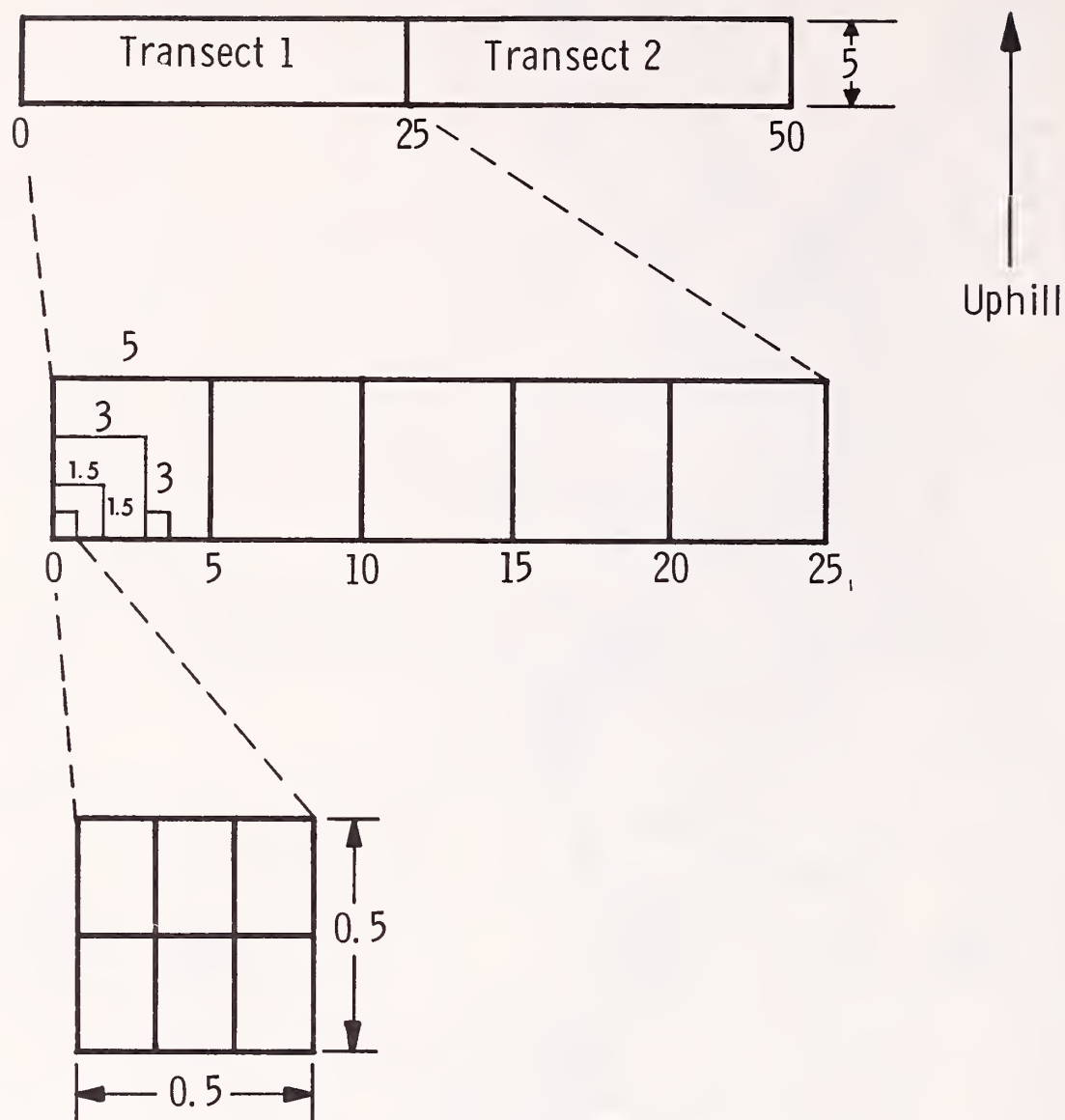


Figure 4.--Field layout of permanent transect pairs showing position and orientation of contiguous blocks and nested plots (dimensions in meters.)

Table 1.--Summary of plots sampled on each study area.

Plot size	Height limits	Vegetation sampled	No./area
----- Meters -----			
5 x 5	2.5 +	Trees and shrubs	10
3 x 3	1.5-2.45	Trees and shrubs	10
1.5 x 1.5	0.5-1.45	Trees and shrubs	10
0.5 x 0.5	<0.5	Trees, shrubs, low woody plants, and all herbs irre- spective of height	20

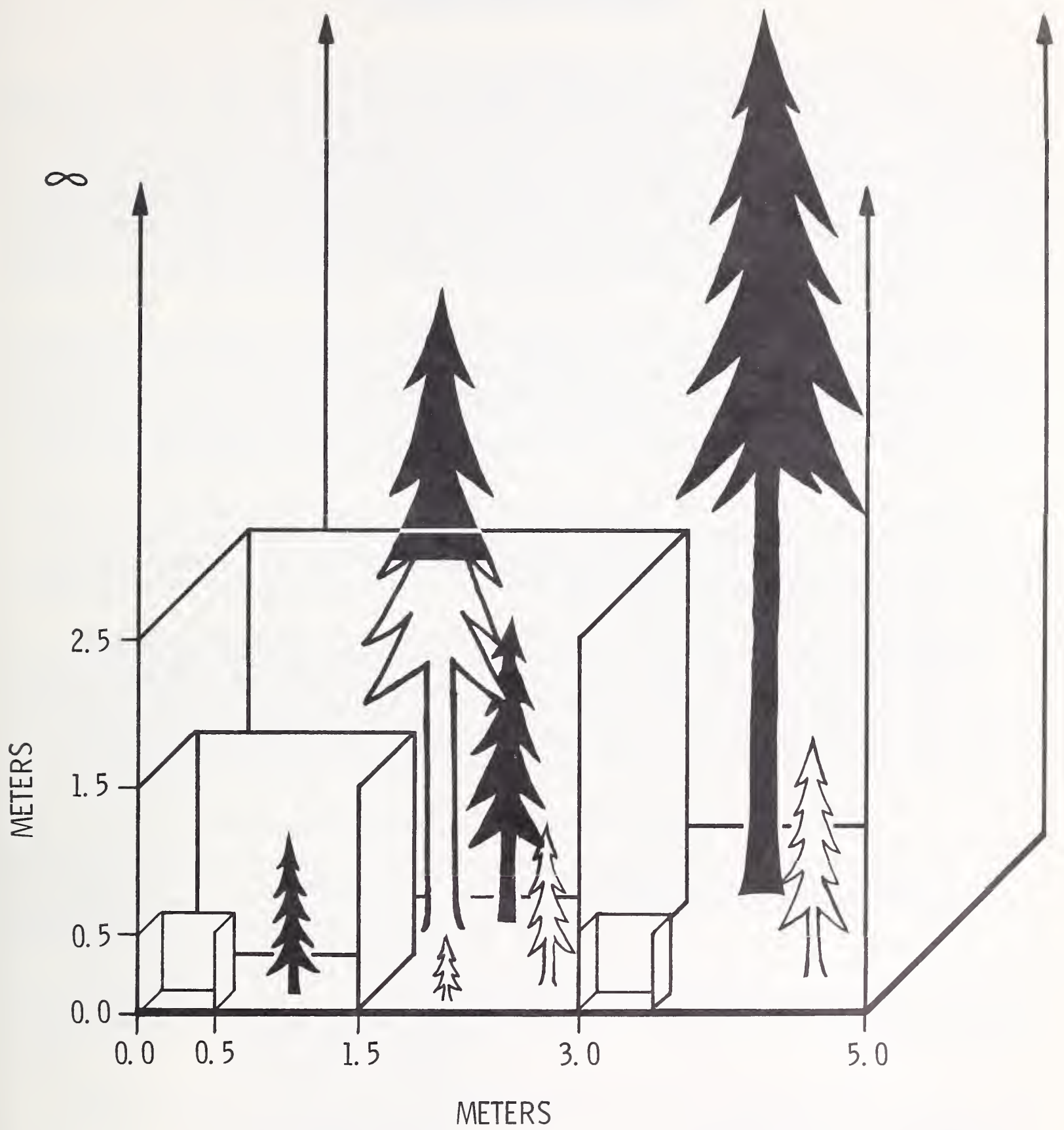


Figure 5.--Size and height limits of nested plots for sampling trees and shrubs (sample trees, dark; nonsample trees, light).

Vegetation Description

Five parameters descriptive of vegetation can be derived from this sampling method (table 2). Of these, cover (aerial crown area) and crown volume (space occupied by the aerial crown) are considered the most descriptive for characterizing vegetation development. Cover for tree and shrub species was determined by treating the two horizontal dimensions of the plant crown as axes of an ellipse and solving for area. Estimates of crown area for herbs and low woody plants, were already in appropriate form. For both kinds of samples, values for cover were averaged for each area and converted to a 0.01 hectare standard. Because this standard equals 100 square meters, the values given for cover in the tables may be read directly as either $\text{m}^2/0.01 \text{ ha}$ or percentage of ground covered.

Aerial crown volume for trees and shrubs was determined for each individual plant from crown area and plant height. The product of these values give the volume of a cylindroid representing the space occupied in the community. In a similar manner, the area and representative height of herbs and low woody plants were multiplied to determine the volume of space occupied. Volumes were averaged and converted to a $\text{m}^3/0.01 \text{ ha}$ standard.

Height is not presented as tabulated information but may be obtained by dividing the volume for any given species by its corresponding cover value. The resulting quotient is mean height in meters. This expression of vertical development is useful as an aid to identifying the periods required for various woody plants to reach mature stature within the successional progression.

Nomenclature for all vascular plants follows Hitchcock and Cronquist (1973).

Table 2.--Parameters describing vegetation development

Vegetative life form (height)	Parameter
Trees (1.5+ m)	Density (No./0.01 ha) Basal area ($\text{cm}^2/0.01 \text{ ha}$)
Shrubs (0.5+ m) and trees (0.5-2.5 m)	Density (No./0.01 ha) Cover ($\text{m}^2/0.01 \text{ ha}$) Volume ($\text{m}^3/0.01 \text{ ha}$)
Herbs and low woody plants (including trees and shrubs <0.5 m)	Frequency (%) Cover ($\text{m}^2/0.01 \text{ ha}$) Volume ($\text{m}^3/0.01 \text{ ha}$)

TABULATED DATA

Content and Organization

For each study area, cover and volume data are presented in a series of six tables. Each table is accompanied by a graph illustrating its important elements. Tables 1 and 2 present cover and volume respectively of the seral community life-forms; tables 3 and 4 present species composition for cover within life form component; and tables 5 and 6 present volume. A section preceeding the tables for each study area describes location and site, forest type and tree composition, and disturbance treatment.

Some of the species included in the herb tables have traditionally been treated as shrubs. They are, in fact, "low woody plants" and lack the morphological traits characteristic of shrubs except one, the presence of perennial stems above ground in the dormant season. Their life form is such that their ecology lies with the ground layer vegetation and not with the strata of the community elevated above the forest floor. Species that have been so treated include *Berberis repens*, *Linnaea borealis*, *Chimaphila umbellata*, and *Pyrola secunda*.

Site and Treatment Information

Reference designations used for study areas, for example, Miller Creek North-6 (MC:N-6), follow those assigned by Beaufait and others (1977) to the experimental burning units. This facilitates direct reference to maps, fire, fuel, and other burning information presented by Beaufait and others. Succession study area numbers, for example, 1802-13 Area 10 (A-10), are also given to provide a ready cross reference to data summaries and facilitate communications on future results of this research.

Habitat type designations characterizing the climax forest community for each study area follow Pfister and others (1977).

Species composition of the predisturbance forest overstory is given as a percentage of the stand basal area. Tree species names are represented by a four-letter abbreviation composed of the first two letters of the genus and species of the botanical name.

The following species were recorded as trees in one or more areas:

<u>Botanical name</u>	<u>Abbreviation</u>
<i>Abies grandis</i>	Abgr
<i>Abies lasiocarpa</i>	Abla
<i>Larix occidentalis</i>	Laoc
<i>Picea engelmannii</i>	Pien
<i>Pinus contorta</i>	Pico
<i>Pinus monticola</i>	Pimo
<i>Pinus ponderosa</i>	Pipo
<i>Pseudotsuga menziesii</i>	Psme
<i>Thuja plicata</i>	Thpl

The information provided under disturbance treatment indicates the kinds of disturbance and also conditions and results of the fire most relevant to postfire plant succession. Data are from Beaufait and others (1977) and from unpublished records at the Forestry Sciences Laboratory and Northern Forest Fire Laboratory in Missoula. Fire intensity, characterized by heat pulse to site, was measured by weight loss from a water can integrating device. The weight values given represent mean water loss for the burning unit. The greater the loss the higher the relative fire intensity. Further information on water loss as a measure of intensity may be found in Beaufait and others (1977), Beaufait (1966), and George (1969). Duff moisture represents the water content of the upper half and lower half of the duff layer immediately before burning. Duff depth indicates the average depth remaining on the unit after burning. Data for some of the fire and fuel parameters are not available for all 20 experimental burning units.

Summary of Study Area Characteristics

Site characteristics represented in the succession profiles for the 20 study areas at Miller Creek and Newman Ridge include physical site features, vegetation type, and season burn.

Three physical features, elevation, exposure of slope, and steepness of slope, are represented. The study areas encompass a 1,000-foot (305-m) elevational range from 4,300 to 5,300 feet (1,315-1,615 m). The number of study areas falling within each 500-foot (152.4-m) contour interval is:

<u>No. of study areas</u>	<u>500-foot (152.4-m) interval</u>
1	4,000-4,450 feet (1,219.2-1,356.4 m)
14	4,500-4,950 feet (1,371.6-1,508.8 m)
5	5,000-5,450 feet (1,524.0-1,661.6 m)

All elevations above 5,000 feet are at Newman Ridge. Cardinal exposures are almost equally represented as follows:

<u>No. of study areas</u>	<u>Exposure</u>
5	North
4	East
5	South
6	West

Steepness of slope varied (5 percent intervals) from 10-60 percent. Grouped in intervals of 20 percent for gentle, moderate, and steep slope, the representation is:

<u>No. of study areas</u>	<u>Slope</u>
5	Gentle (0%-15%)
9	Moderate (20%-35%)
6	Steep (>35%)

The vegetation characterized in terms of climax forest type (Pfister and others 1977) represents four habitat types and seven phases as follows:

<u>No. of study areas</u>	<u>Habitat type (phase)</u>
1 (1)	Thuja plicata/Clintonia uniflora (Menziesia feruginea Phase)
4 (4)	Abies grandis/Clintonia uniflora (Xerophyllum tenax Phase)
14 (1) (1) (4) (8)	Abies lasiocarpa/Clintonia uniflora (Aralia nudicaulis Phase) (Clintonia uniflora Phase) (Menziesia ferruginea Phase) (Xerophyllum tenax Phase)
1 (1)	Pseudotsuga menziesii/Vaccinium globulare (Xerophyllum tenax Phase)

The time of burning for the succession study areas extended from May through October. The number of burns by season were:

<u>No. of study areas</u>	<u>Season of burn</u>
3	Spring (May-June 21)
11	Summer (June 21-Sept. 21)
6	Fall (Sept. 21-Oct.)

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INDEX TO TABLES FOR STUDY AREAS AT MILLER CREEK AND NEWMAN RIDGE

Tabulated data for study areas are ordered by burning treatment, geographic location, and exposure of slope.

<i>Burning unit</i>	<i>Study area No.</i>	<i>Table No.</i>	<i>Page</i>
Prescribed broadcast burn on clearcut area			
MILLER CREEK:	(11 areas)		
North - 6	18-1	1-1 - 1-6	14-19
North - 7	10	2-1 - 2-6	20-25
North - 8	15	3-1 - 3-6	26-31
East - 6	11	4-1 - 4-6	32-37
East - 8	21-1	5-1 - 5-6	38-43
East - 9	21-3	6-1 - 6-6	44-49
South - 1	12	7-1 - 7-6	50-55
South - 2	14-3	8-1 - 8-6	56-61
West - 3	20	9-1 - 9-6	62-67
West - 10	17-1	10-1 - 10-6	68-73
West - 15	17-3	11-1 - 11-6	74-79
NEWMAN RIDGE:	(6 areas)		
North - 2	26	12-1 - 12-6	80-85
East - 3	27	13-1 - 13-6	86-91
South - 2	24	14-1 - 14-6	92-97
South - 3	28	15-1 - 15-6	98-103
West - 2	25	16-1 - 16-6	104-109
West - 3	29	17-1 - 17-6	110-115
Wildfire in standing timber			
MILLER CREEK:	(3 areas)		
South - 12	22-3	18-1 - 18-6	116-121
South - 13	22-1	19-1 - 19-6	122-127
West - 6	23	20-1 - 20-6	128-133

MILLER CREEK: North-6 (1802-13 Area 18-1)

Site location and description: NW $\frac{1}{4}$ NW $\frac{1}{4}$ Sec. 29, T32N R24W MPM.

Elevation: 4,900 ft; Exposure: North (Az. 360°); Slope: 25%

Habitat type: *Abies lasiocarpa*/*Clintonia uniflora*, *Menziesia ferruginea* Phase

Predisturbance forest stand: Pien 33%, Abia 24%, Psme 24%, Laoc 20%
(Stand basal area: 4,215 cm²/0.01 ha)

Disturbance treatment: Logged August 1967; Slashed October 1967;

Broadcast-burned: Sept. 10, 1968 (Succession year 1:1969);

Fire intensity: 303 g water loss; Duff moisture: Upper 106%,
Lower 176%; Postfire duff depth: 7.0 cm (86% of preburn depth)

Table 1-1.--Successional development of vegetative cover
(m²/0.01 ha or %), fig. 1-1.

Life-form component	Succession year									
	Pre	1	2	3	4	5	6	7	8	
Tree	-	-	-	-	-	-	-	-	-	
Shrub	90	2	8	11	13	20	20	35	29	
Herb	7	6	35	35	27	26	22	36	29	
Total veg.	97	8	43	46	41	46	42	71	58	
Exposed ground surface:										
Bare ground	-	8	-	-	-	-	-	-	-	
Rock	-	-	-	-	-	-	-	-	-	
Litter	55	84	56	50	52	49	44	31	40	
Moss	27	-	1	4	7	6	14	9	6	

Table 1-2.--Successional development of vegetative volume
(m³/0.01 ha), fig. 1-2.

Life-form component	Succession year									
	Pre	1	2	3	4	5	6	7	8	
Tree	-	-	-	-	-	-	-	-	-	
Shrub	137.7	0.2	2.2	2.5	3.6	5.3	5.2	12.9	8.1	
Herb	.4	.8	17.2	19.2	15.5	17.4	11.0	18.8	14.2	
Total veg.	138.2	1.0	19.4	21.8	19.1	22.7	16.2	31.7	22.3	

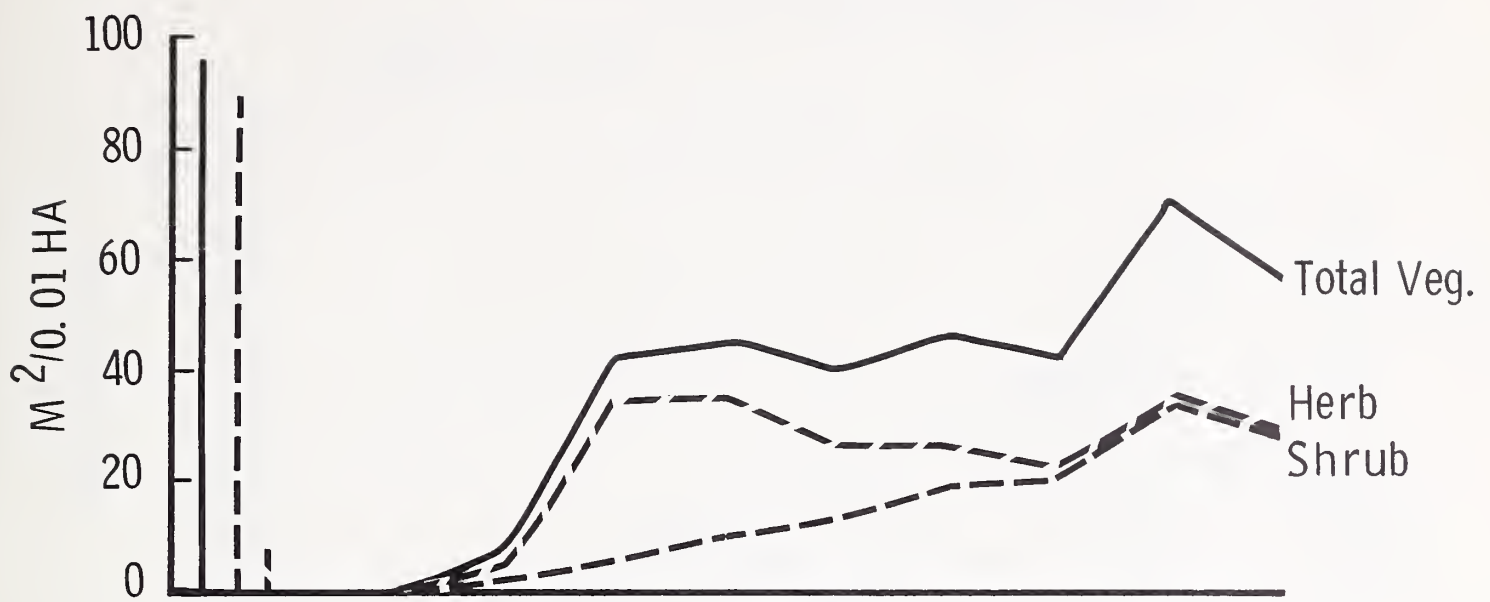


Figure 1-1. Vegetative cover.

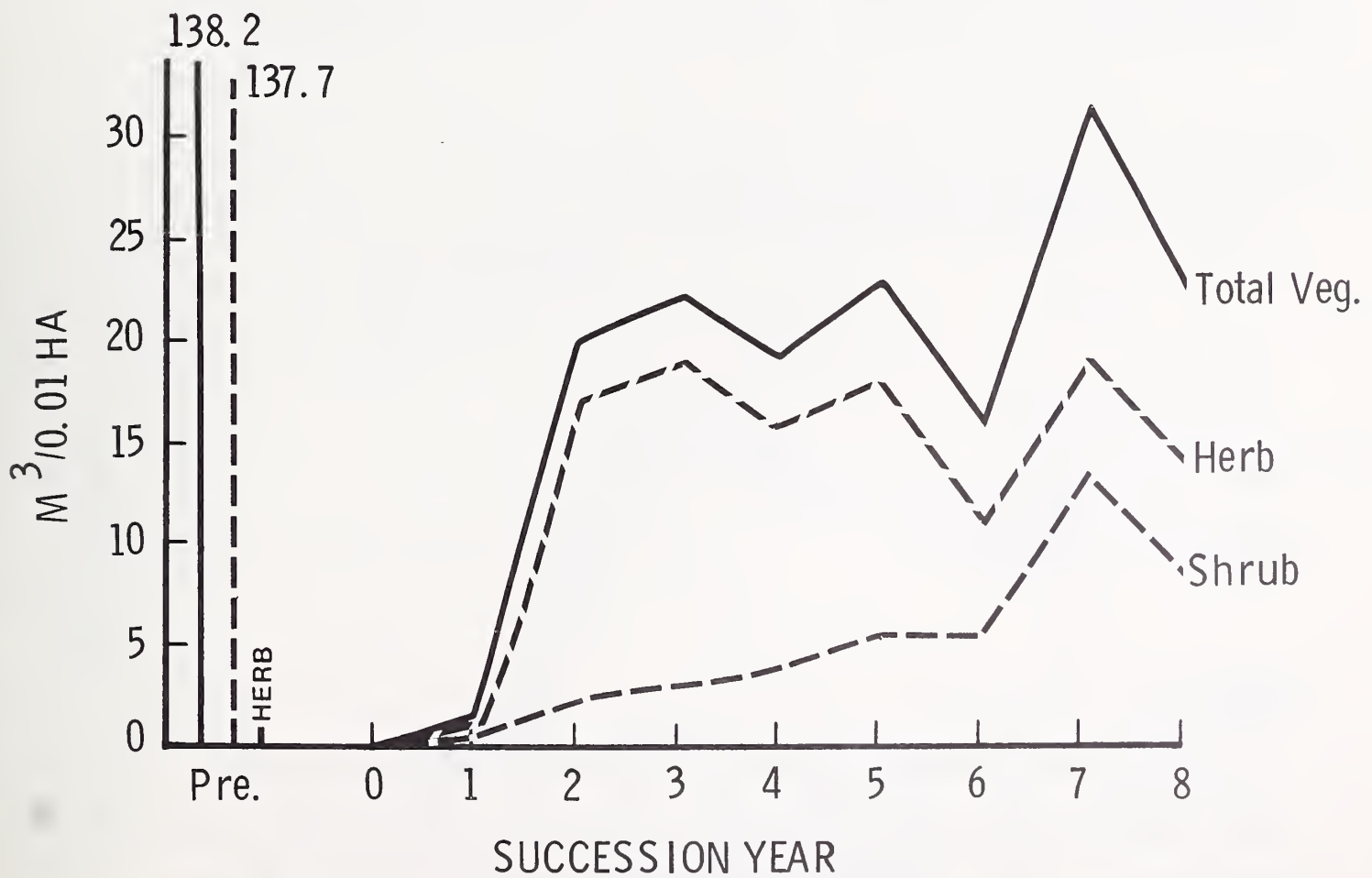


Figure 1-2. Vegetative volume.

MC: N-6 (A-18-1)

Table 1-3.--Cover development of shrub component
(m²/0.01 ha or %), fig. 1-3.

Species		Succession year								
		Pre :	1 :	2 :	3 :	4 :	5 :	6 :	7 :	8
<i>Acer glabrum</i>	5	-	-	-	-	-	-	-	-	-
<i>Lonicera utahensis</i>	1	-	-	-	-	-	-	-	1	1
<i>Menziesia ferruginea</i>	14	-	1	2	1	2	-	<1	-	-
<i>Pachistima myrsinites</i>	6	-	-	-	1	1	2	4	5	
<i>Ribes lacustre</i>	-	-	-	1	1	1	-	-	-	-
<i>Rubus parviflorus</i>	-	2	6	5	6	11	10	15	10	
<i>Salix scouleriana</i>	-	-	-	-	-	-	-	-	1	1
<i>Taxus brevifolia</i>	50	-	-	-	-	-	-	-	-	-
<i>Vaccinium globulare</i>	16	-	2	3	5	5	8	14	12	
Total shrubs	90	2	8	11	13	20	20	35	29	

Table 1-4.--Cover development of herb component
(m²/0.01 ha or %), fig. 1-4.

Species		Succession year								
		Pre :	1 :	2 :	3 :	4 :	5 :	6 :	7 :	8
<i>Arnica latifolia</i>	-	-	4	2	-	1	-	2	5	
<i>Clintonia uniflora</i>	-	-	-	-	-	-	-	-	-	1
<i>Epilobium angustifolium</i>	-	3	29	32	24	25	21	27	21	
<i>Erigeron acris</i>	-	-	-	-	-	-	-	-	1	-
<i>Goodyera oblongifolia</i>	1	-	-	-	-	-	-	-	-	-
<i>Viola orbiculata</i>	1	-	-	-	-	-	-	-	-	-
Misc. herbs	5	2	2	1	3	-	2	5	2	
Total herbs	7	6	35	35	27	26	22	36	29	

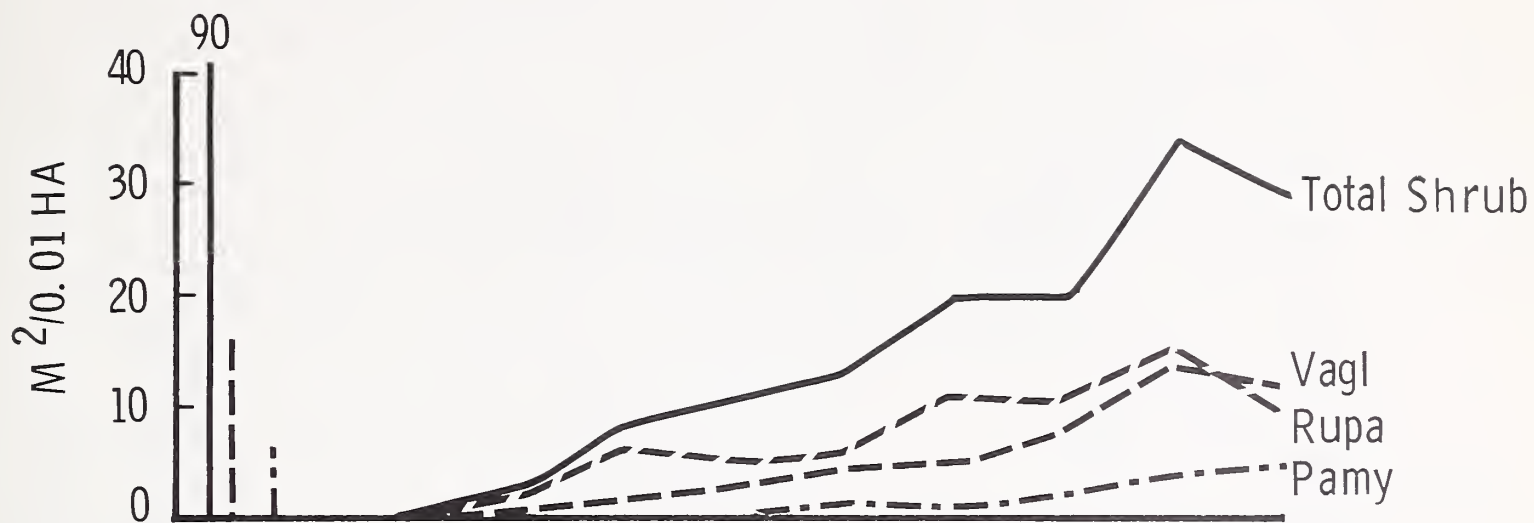


Figure 1-3. Shrub cover.

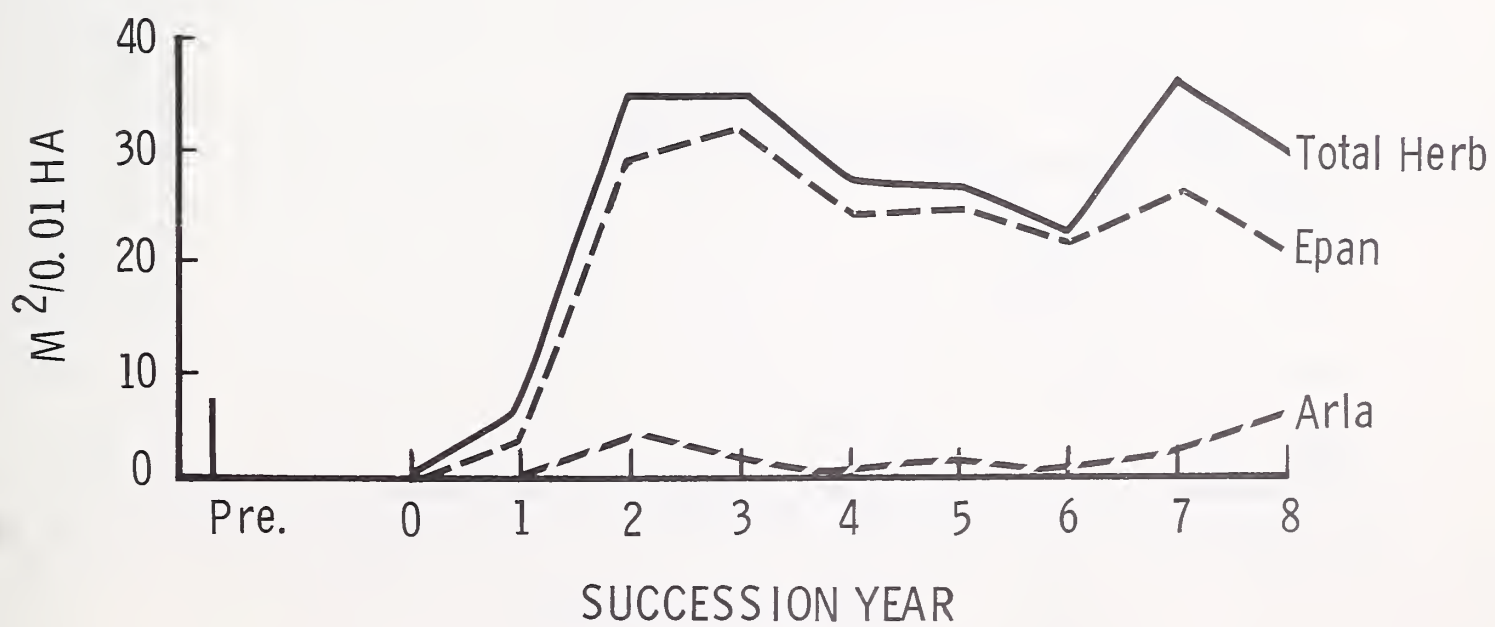


Figure 1-4. Herb cover.

Table 1-5.--Volume development of shrub component ($m^3/0.01$ ha), fig. 1-5.

Species		Succession year								
		Pre	1	2	3	4	5	6	7	8
<i>Acer glabrum</i>	16.6	-	-	-	-	-	-	-	-	-
<i>Lonicera utahensis</i>	.5	-	-	-	-	-	-	-	0.8	0.8
<i>Menziesia ferruginea</i>	17.8	-	0.2	0.7	0.3	0.7	-	.2	-	-
<i>Pachistima myrsinites</i>	.9	-	-	-	.1	.1	0.4	1.2	.6	-
<i>Ribes lacustre</i>	-	-	-	.2	.2	.2	-	-	-	-
<i>Rubus parviflorus</i>	-	.2	1.7	1.0	2.0	3.5	3.0	6.2	2.9	-
<i>Salix scouleriana</i>	-	-	-	-	-	-	-	.4	.7	-
<i>Taxus brevifolia</i>	93.0	-	-	-	-	-	-	-	-	-
<i>Vaccinium globulare</i>	9.0	-	.3	.7	1.0	.8	1.8	4.1	3.1	-
Total shrubs	137.7	.2	2.2	2.5	3.6	5.3	5.2	12.9	8.1	-

Table 1-6.--Volume development of herb component ($m^3/0.01$ ha), fig. 1-6.

Species		Succession year								
		Pre	1	2	3	4	5	6	7	8
<i>Arnica latifolia</i>	-	-	1.4	0.2	-	0.1	-	0.2	0.5	-
<i>Clintonia uniflora</i>	-	-	-	-	-	-	-	-	-	.1
<i>Epilobium angustifolium</i>	-	0.6	15.4	19.0	14.7	17.3	10.5	17.7	13.2	-
<i>Erigeron acris</i>	-	-	-	-	-	-	-	.2	-	-
<i>Goodyera oblongifolia</i>	<0.1	-	-	-	-	-	-	-	-	-
<i>Viola orbiculata</i>	<.1	-	-	-	-	-	-	-	-	-
Misc. herbs	.4	.2	.3	<.1	.8	-	.5	.8	.4	-
Total herbs	.4	.8	17.2	19.2	15.5	17.4	11.0	18.8	14.2	-



Figure 1-5. Shrub volume.

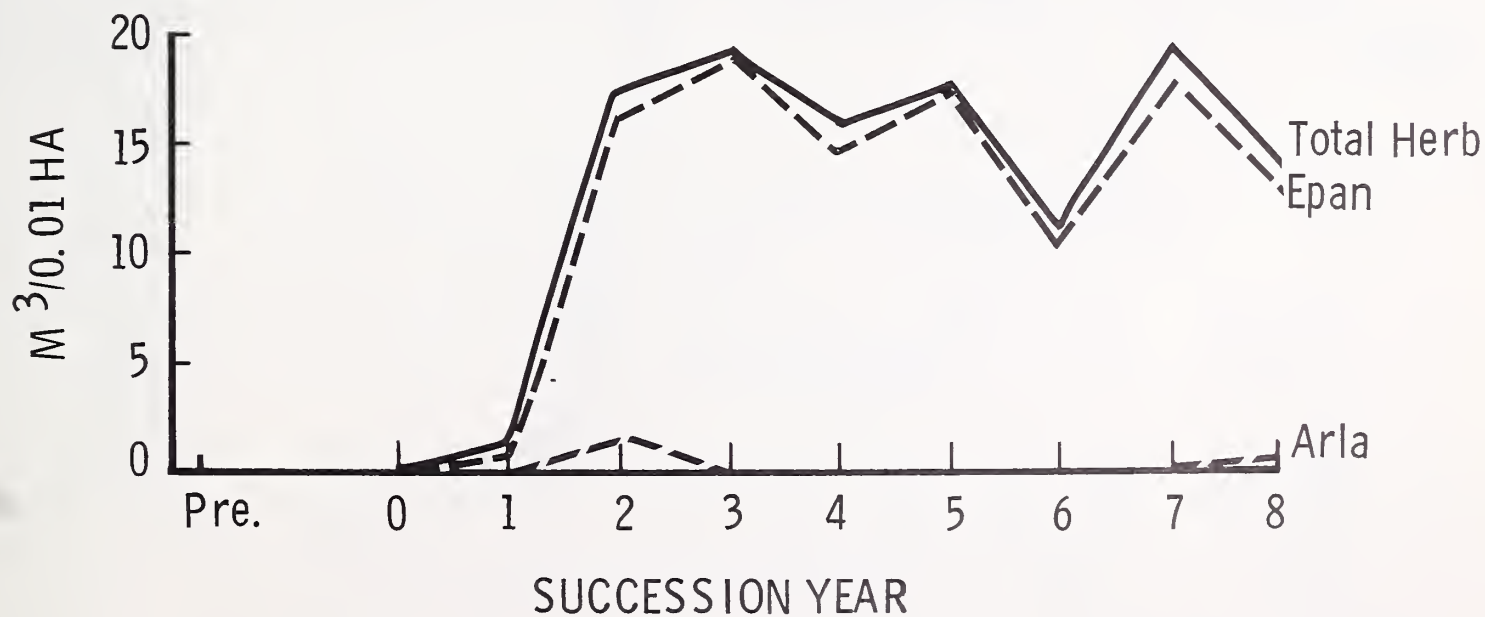


Figure 1-6. Herb volume.

MILLER CREEK: North-7 (1802-13 Area 10)

Site location and description: NE $\frac{1}{4}$ NE $\frac{1}{4}$ Sec. 30, T32N R24W MPM.

Elevation 4,950 ft; Exposure: North (Az. 16°) Slope: 30%

Habitat type: *Abies lasiocarpa*/*Clintonia uniflora*, *Menziesia ferruginea* Phase

Predisturbance forest stand: Pien 63%, Abia 13%, Laoc 12%, Pico 10%, Psme 2% (Stand basal area: 6,340 cm²/0.01 ha)

Disturbance treatment: Logged January 1967; Slashed February 1967;

Broadcast-burned: June 18, 1968 (Succession year 1:1968);

Fire intensity: 242 g water loss; Duff moisture: Upper 45%, Lower 194%; Postfire duff depth: 4.5 cm (51% of preburn depth)

Table 2-1.--Successional development of vegetative cover (m²/0.01 ha or %), fig. 2-1.

Life-form component	Succession year										
	Pre	1	2	3	4	5	6	7	8	9	
Tree	-	-	-	-	-	-	-	-	-	-	
Shrub	64	-	2	9	14	11	21	27	44	41	
Herb	11	-	7	49	42	42	32	31	41	32	
Total veg.	74	-	10	58	56	54	53	57	85	74	

Exposed ground surface:

Bare ground	-	5	6	-	-	1	-	-	-	-
Rock	-	1	-	-	1	-	2	-	-	-
Litter	57	94	85	44	44	42	49	33	19	31
Moss	22	-	-	2	4	8	4	16	17	12

Table 2-2.--Successional development of vegetative volume (m³/0.01 ha), fig. 2-2.

Life-form component	Succession year										
	Pre	1	2	3	4	5	6	7	8	9	
Tree	-	-	-	-	-	-	-	-	-	-	
Shrub	70.7	-	0.6	4.4	6.2	4.2	9.9	10.6	26.6	26.6	
Herb	.8	-	1.5	28.9	21.9	21.9	21.4	14.9	24.8	19.8	
Total veg.	71.5	-	2.1	33.3	28.1	26.0	31.3	25.5	51.4	46.4	

MC: N-7 (A-10)

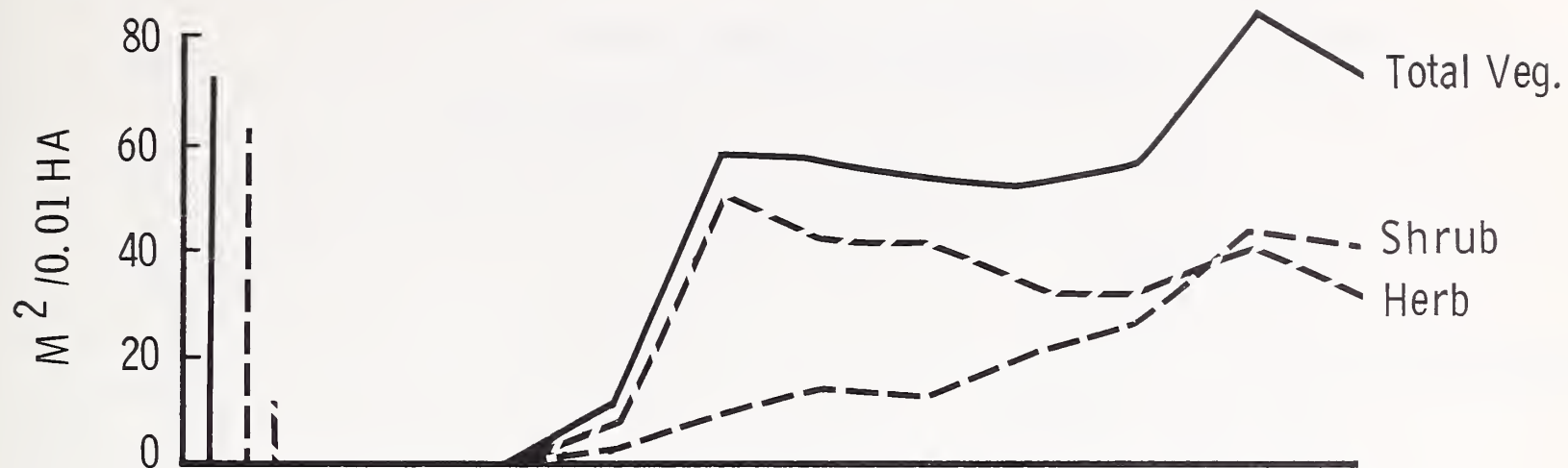


Figure 2-1. Vegetative cover.

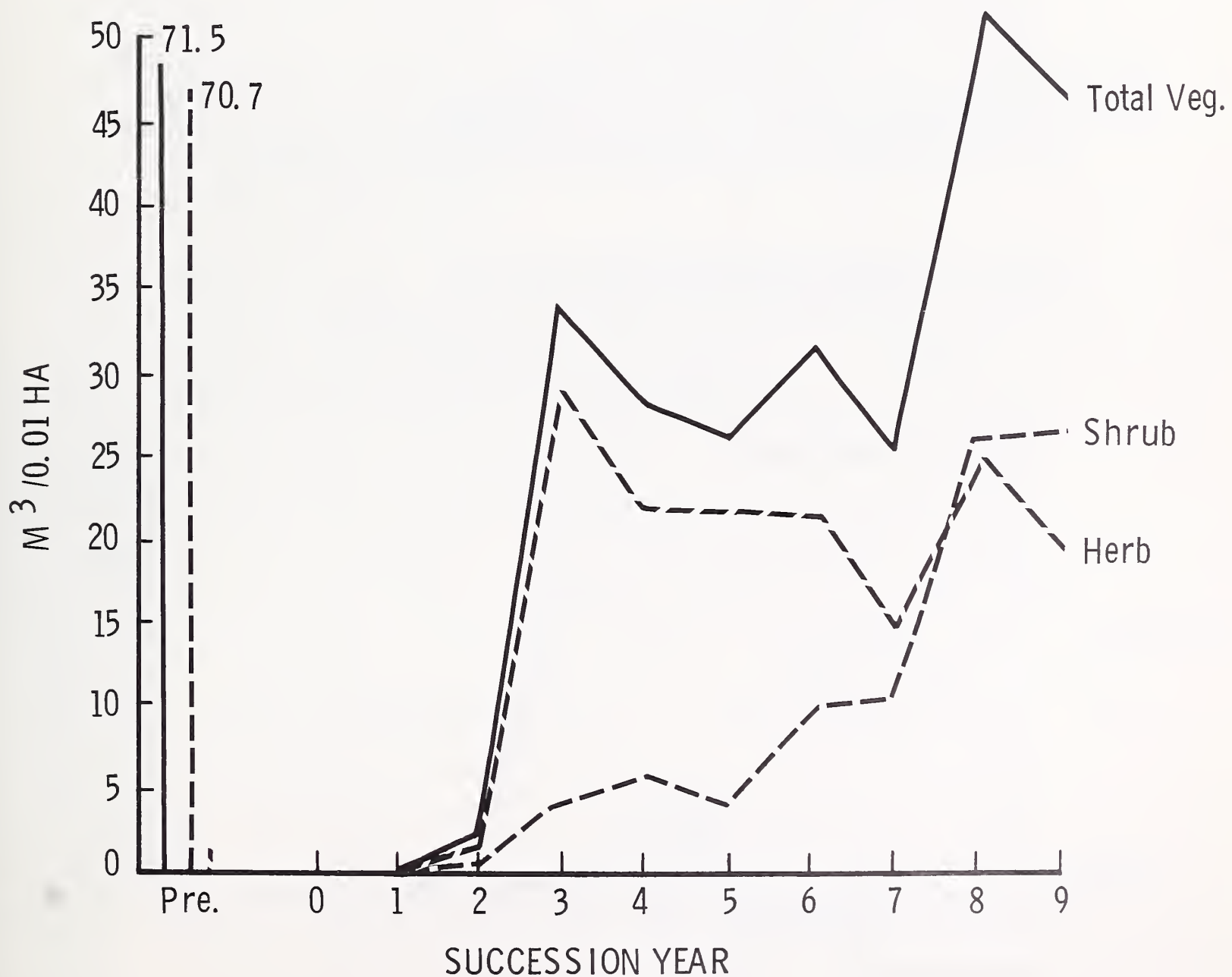


Figure 2-2. Vegetative volume.

MC: N-7 (A-10)

Table 2-3.--Cover development of shrub component
(m²/0.01 ha or %), fig. 2-3.

Species	Succession year									
	Pre	1	2	3	4	5	6	7	8	9
<i>Alnus sinuata</i>	4	-	<1	-	-	-	-	-	-	1
<i>Lonicera utahensis</i>	-	-	-	-	-	-	-	-	-	1
<i>Menziesia ferruginea</i>	18	-	-	-	1	1	2	2	8	4
<i>Pachistima myrsinites</i>	2	-	-	-	-	-	1	2	3	5
<i>Salix scouleriana</i>	-	-	<1	<1	-	1	3	-	6	6
<i>Sambucus racemosa</i>	-	-	<1	4	4	1	2	5	3	3
<i>Taxus brevifolia</i>	16	-	-	-	-	-	-	-	-	-
<i>Vaccinium globulare</i>	25	-	2	5	9	8	13	18	23	21
Total shrubs	64	-	2	9	14	11	21	27	44	41

Table 2-4.--Cover development of herb component
(m²/0.01 ha or %), fig. 2-4.

Species	Succession year									
	Pre	1	2	3	4	5	6	7	8	9
<i>Anaphalis margaritaceae</i>	-	-	-	-	-	-	-	-	-	1
<i>Arnica latifolia</i>	-	-	1	1	1	1	-	-	2	4
<i>Chimaphila umbellata</i>	1	-	-	-	-	-	-	-	-	-
<i>Clintonia uniflora</i>	2	-	-	-	-	-	-	-	-	-
<i>Deschampsia elongata</i>	-	-	-	-	-	-	-	3	2	-
<i>Epilobium angustifolium</i>	-	-	6	39	31	36	24	24	31	25
<i>Epilobium paniculatum</i>	-	-	-	4	7	-	-	-	-	-
<i>Goodyera oblongifolia</i>	3	-	-	-	-	-	-	-	-	-
<i>Pyrola secunda</i>	1	-	-	-	-	-	-	-	-	-
<i>Thalictrum occidentale</i>	1	-	-	2	2	3	2	2	4	2
<i>Viola orbiculata</i>	1	-	1	1	-	-	-	-	-	-
Misc. herbs	2	-	-	2	2	2	5	1	2	-
Total herbs	11	-	7	49	42	42	32	31	41	32

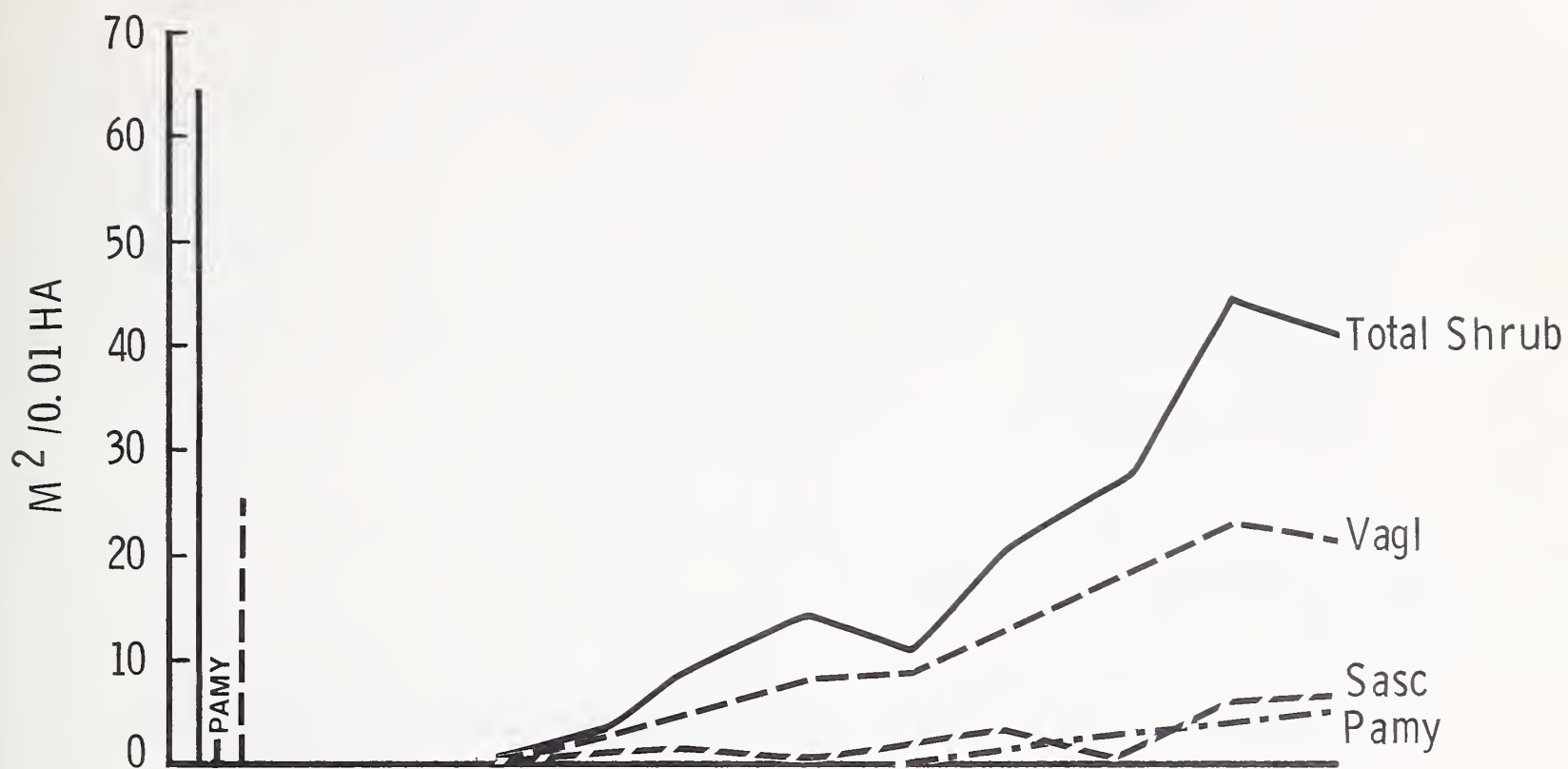


Figure 2-3. Shrub cover.

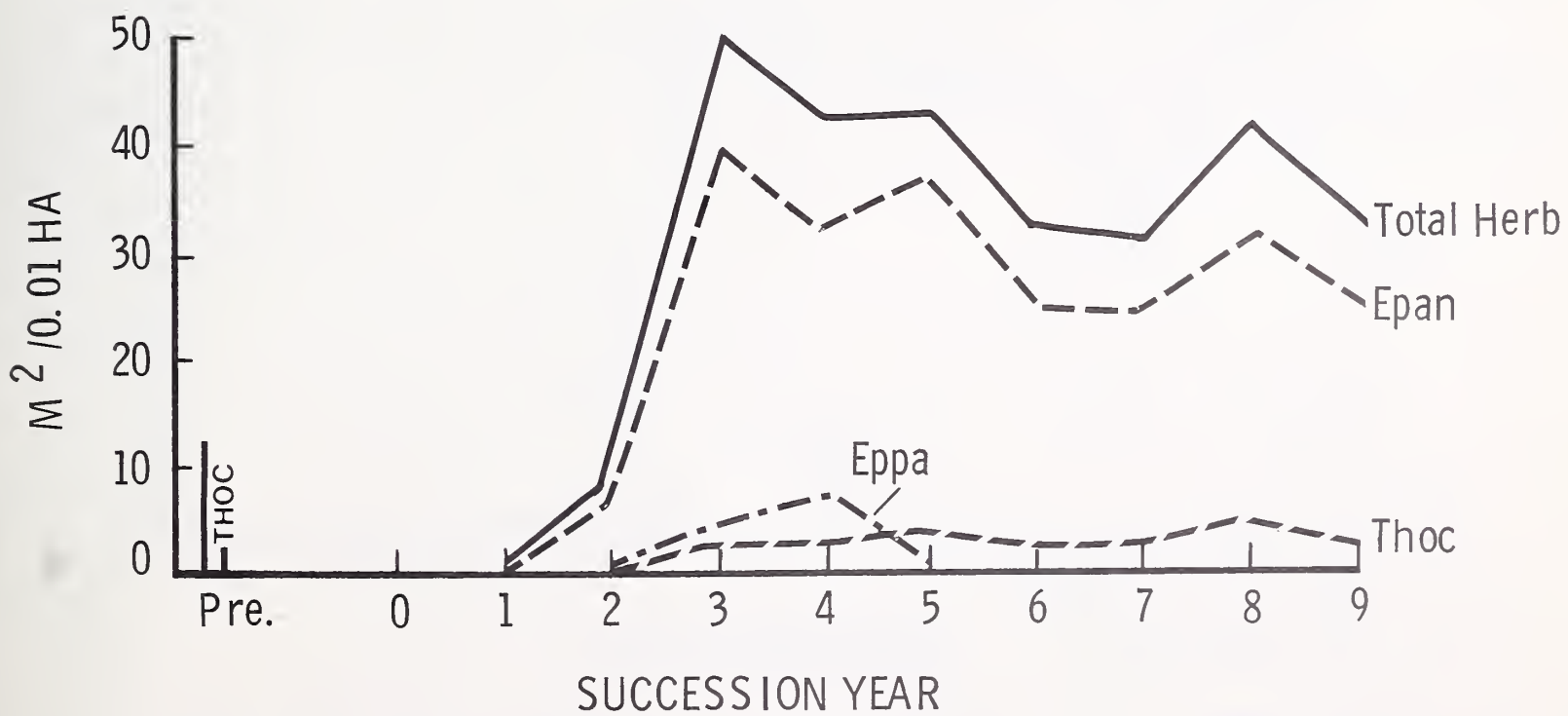


Figure 2-4. Herb cover.

MC: N-7 (A-10)

Table 2-5.--Volume development of shrub component ($m^3/0.01$ ha), fig. 2-5.

Species		Succession year									
		Pre :	1 :	2 :	3 :	4 :	5 :	6 :	7 :	8 :	9
<i>Alnus sinuata</i>	10.4	-	0.2	-	-	-	-	-	-	-	3.2
<i>Lonicera utahensis</i>	-	-	-	-	-	-	-	-	-	-	1.1
<i>Menziesia ferruginea</i>	24.0	-	-	-	0.5	0.8	1.6	1.3	6.7	3.2	
<i>Pachistima myrsinites</i>	.2	-	-	-	-	-	.2	.2	.6	1.4	
<i>Salix scouleriana</i>	-	-	0.2	0.4	-	.6	2.9	-	8.8	8.2	
<i>Sambucus racemosa</i>	-	-	.1	3.3	3.3	.9	1.2	4.3	2.4	3.0	
<i>Taxus brevifolia</i>	22.0	-	-	-	-	-	-	-	-	-	
<i>Vaccinium globulare</i>	14.2	-	.2	.7	2.4	2.0	4.1	4.8	8.1	6.4	
Total shrubs	70.7	-	.6	4.4	6.2	4.2	9.9	10.6	26.6	26.6	

Table 2-6.--Volume development of herb component ($m^3/0.01$ ha), fig. 2-6.

Species		Succession year									
		Pre :	1 :	2 :	3 :	4 :	5 :	6 :	7 :	8 :	9
<i>Anaphalis margaritaceae</i>	-	-	-	-	-	-	-	-	-	-	0.2
<i>Arnica latifolia</i>	-	-	0.2	0.2	<0.1	0.1	-	-	0.2	.6	
<i>himaphila umbellata</i>	0.1	-	-	-	-	-	-	-	-	-	
<i>lintonia uniflora</i>	.1	-	-	-	-	-	-	-	-	-	
<i>Deschampsia elongata</i>	-	-	-	-	-	-	-	0.5	0.2	-	
<i>Epilobium angustifolium</i>	-	-	1.2	23.7	19.0	20.5	19.9	13.8	23.2	18.4	
<i>Epilobium paniculatum</i>	-	-	-	3.7	2.0	-	-	-	-	-	
<i>Goodyera oblongifolia</i>	.2	-	-	-	-	-	-	-	-	-	
<i>Pyrola secunda</i>	.1	-	-	-	-	-	-	-	-	-	
<i>Thalictrum occidentale</i>	.2	-	-	.8	.5	1.0	.5	.5	.9	.5	
<i>Viola orbiculata</i>	<.1	-	<.1	<.1	-	-	-	-	-	-	
Misc. herbs	.2	-	-	.4	.4	.3	1.0	.1	.2	-	
Total herbs	.8	-	1.5	28.9	21.9	21.9	21.4	14.9	24.8	19.8	

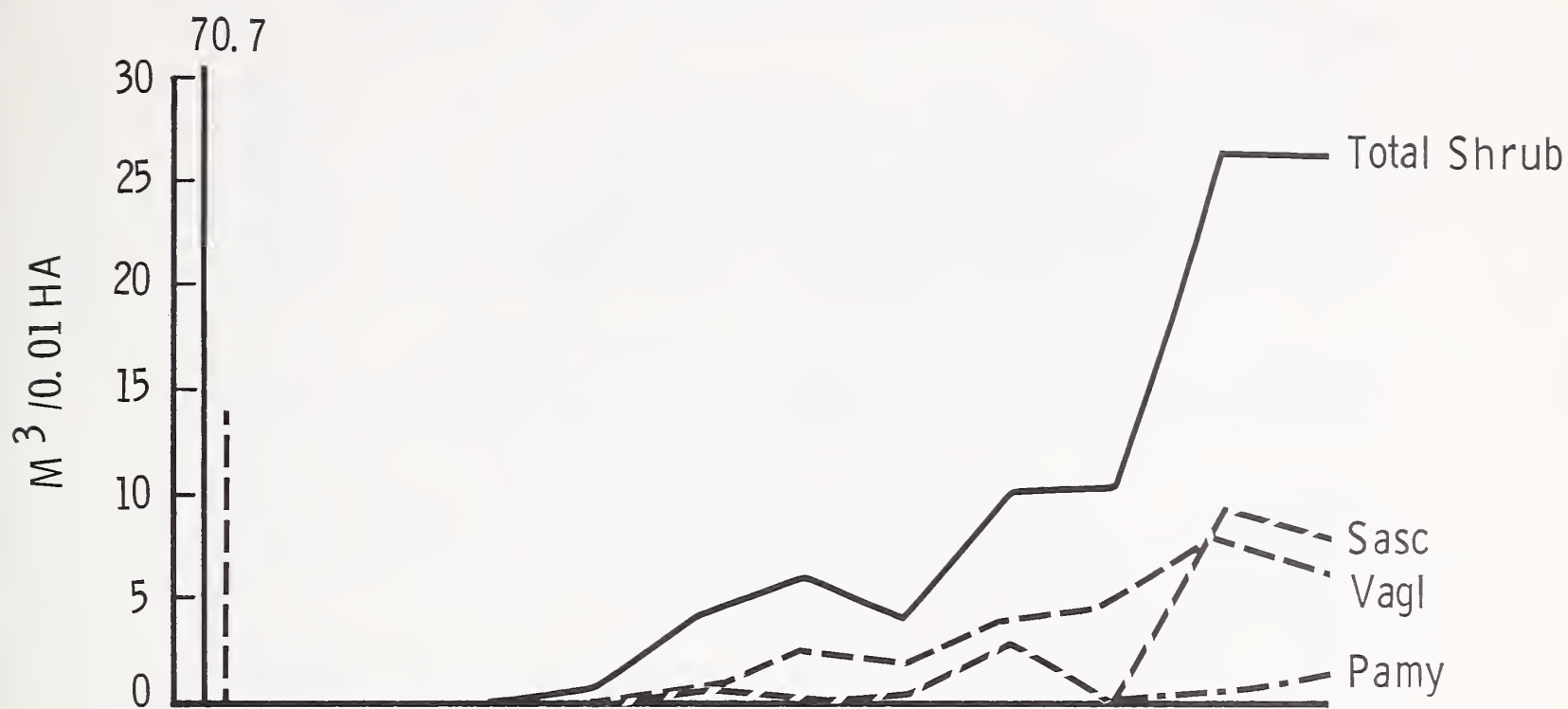


Figure 2-5. Shrub volume.

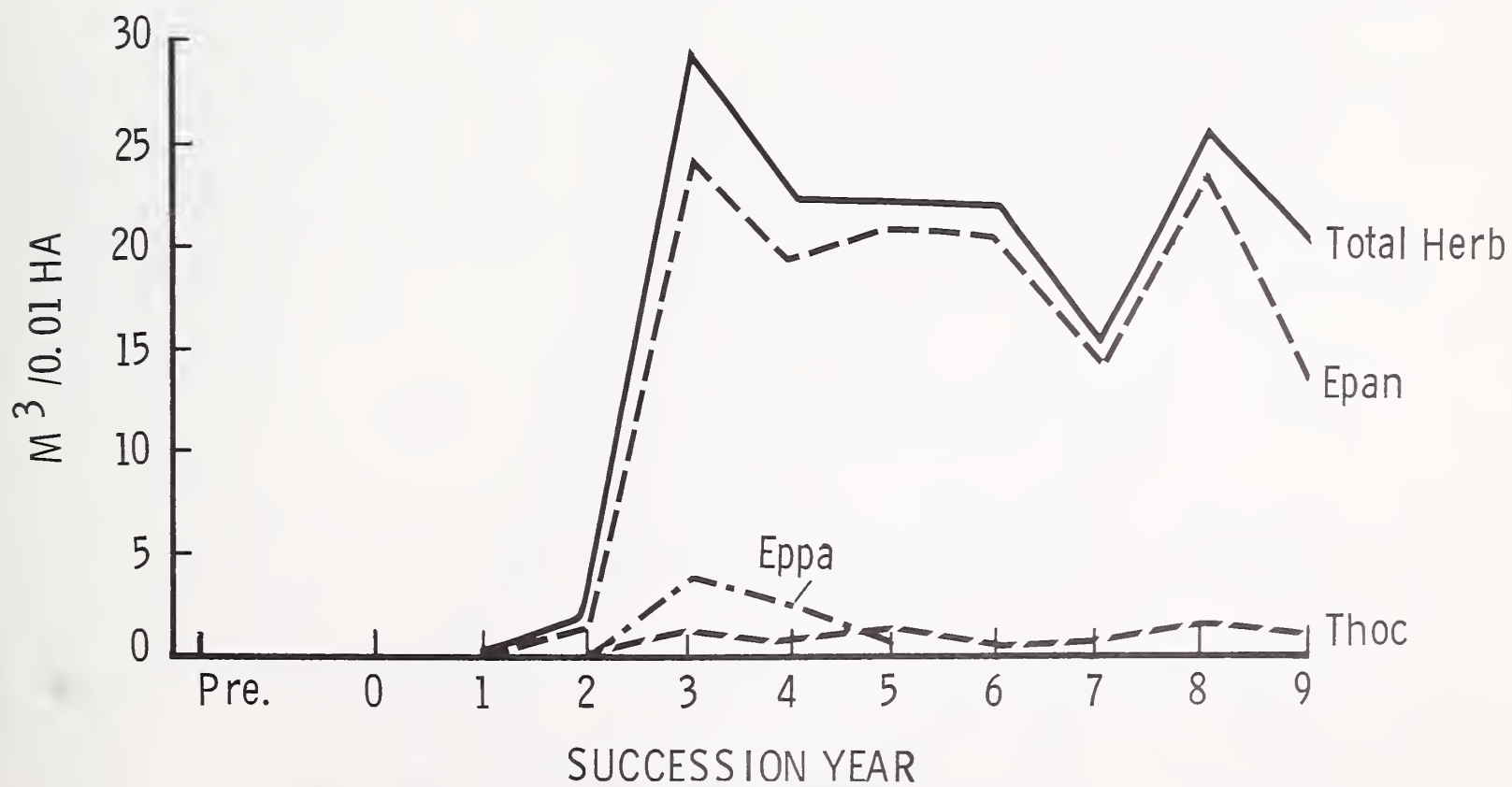


Figure 2-6. Herb volume.

MILLER CREEK: North-8 (1802-13 Area 15)

Site location and description: NE $\frac{1}{4}$ NE $\frac{1}{4}$ Sec. 30, T32N R24W MPM.

Elevation: 4,900 ft; Exposure: Northwest (Az. 332°); Slope: 30%

Habitat type: *Abies lasiocarpa*/*Clintonia uniflora*, *Menziesia ferruginea* Phase

Predisturbance forest stand: Laoc 58%, Pien 21%, Abia 11%, Psme 9%
(Stand basal area: 6,476 cm²/0.01 ha)

Disturbance treatment: Logged January 1968; Slashed February 1968;

Broadcast-burned: September 10, 1968 (Succession year 1:1969);

Fire intensity: 266 g water loss; Duff moisture: Upper 227%,

Lower 215%; Postfire duff depth: 6.0 cm (94% of preburn depth)

Table 3-1.--Successional development of vegetative cover
(m²/0.01 ha or %), fig. 3-1.

Life-form component	Succession year									
	Pre	1	2	3	4	5	6	7	8	
Tree	-	-	-	-	-	-	-	-	<1	
Shrub	69	1	11	11	14	19	19	33	38	
Herb	14	16	51	38	32	26	31	47	33	
Total veg.	84	17	62	50	47	45	50	80	72	

Exposed ground surface:

Bare ground	-	4	-	-	1	-	-	-	-
Rock	-	-	-	-	-	1	1	1	1
Litter	55	79	41	52	53	54	49	28	42
Moss	22	-	-	3	3	7	11	8	5

Table 3-2.--Successional development of vegetative volume
(m³/0.01 ha), fig. 3-2.

Life-form component	Succession year									
	Pre	: 1	: 2	: 3	: 4	: 5	: 6	: 7	: 8	
Tree	-	-	-	-	-	-	-	-	0.3	
Shrub	108.1	0.2	4.8	5.0	5.2	8.0	6.6	16.7	19.0	
Herb	1.0	5.2	26.1	17.2	16.1	12.4	14.3	26.3	14.9	
Total veg.	109.1	5.4	30.9	22.1	21.3	20.4	20.9	43.0	34.2	

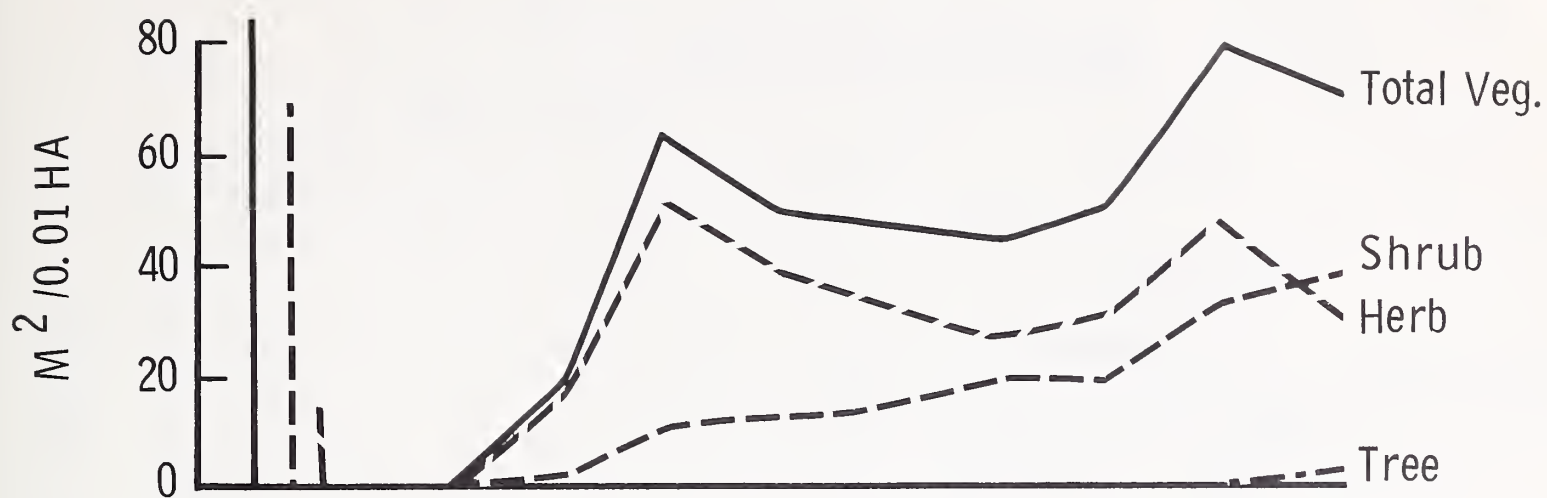


Figure 3-1. Vegetative cover.

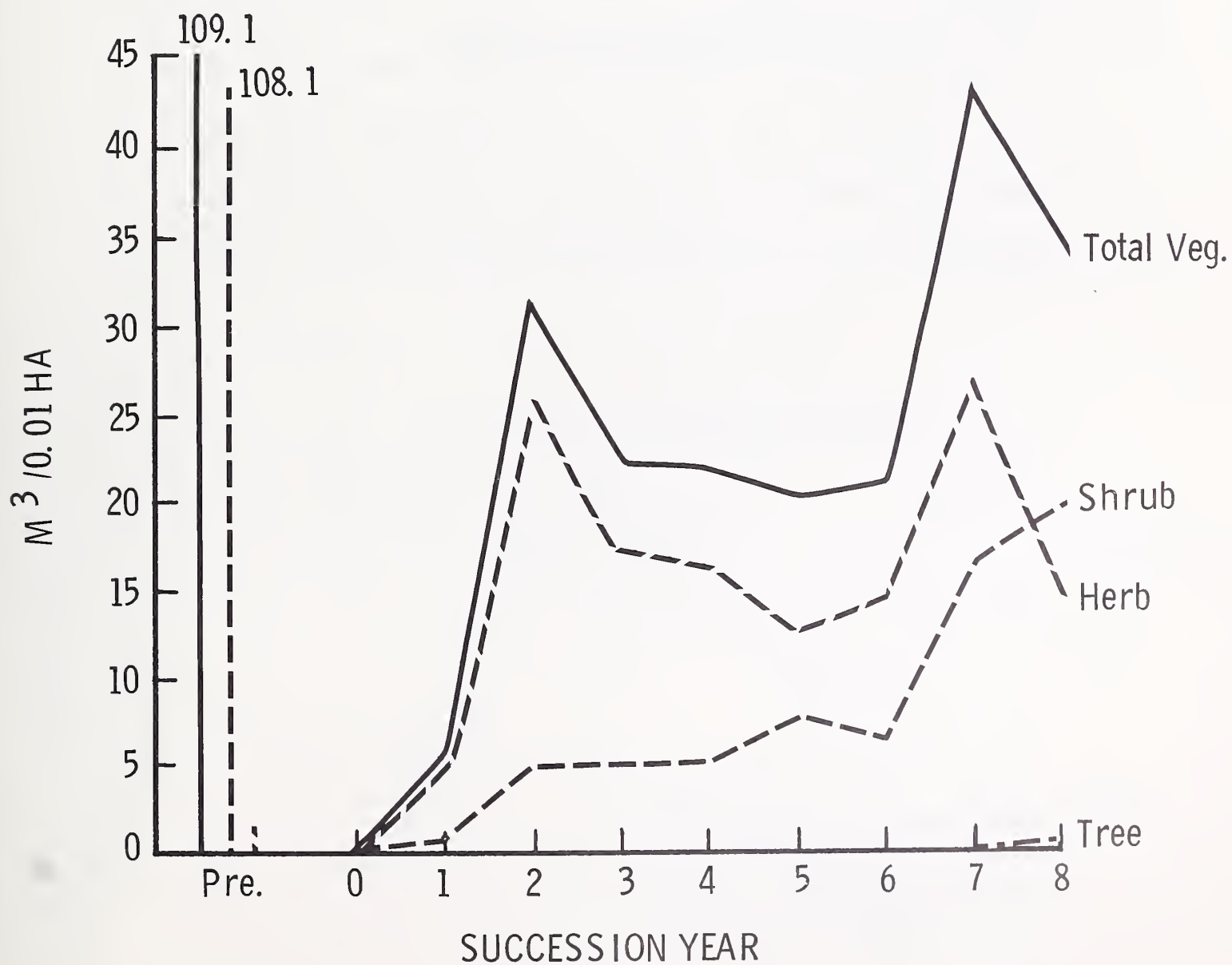


Figure 3-2. Vegetative volume.

MC: N-8 (A-15)

Table 3-3.--Cover development of shrub component
(m²/0.01 ha or %), fig. 3-3.

Species		Succession year								
		Pre	1	2	3	4	5	6	7	8
<i>Alnus sinuata</i>	4	-	-	-	-	-	-	-	-	-
<i>Lonicera utahensis</i>	1	-	3	4	2	2	7	5	6	
<i>Menziesia ferruginea</i>	25	-	1	2	4	6	-	8	8	
<i>Pachistima myrsinites</i>	2	-	-	-	-	-	1	5	4	
<i>Ribes lacustre</i>	-	-	-	-	-	1	-	1	3	
<i>Rosa gymnocarpa</i>	-	<1	-	-	-	-	-	-	-	
<i>Rubus parviflorus</i>	1	1	3	1	2	2	3	6	6	
<i>Salix scouleriana</i>	-	-	-	-	-	-	-	1	1	
<i>Sambucus racemosa</i>	-	-	1	1	<1	-	-	1	-	
<i>Taxus brevifolia</i>	27	-	-	-	-	-	-	-	-	
<i>Vaccinium globulare</i>	9	-	2	3	6	8	8	8	10	
Total shrubs	69	1	11	17	14	19	19	33	38	

Table 3-4.--Cover development of herb component
(m²/0.01 ha or %), fig. 3-4.

Species		Succession year								
		Pre	1	2	3	4	5	6	7	8
<i>Arnica latifolia</i>	4	4	11	8	4	1	-	7	5	
<i>Chimaphila umbellata</i>	1	-	-	-	-	-	-	-	-	
<i>Clintonia uniflora</i>	-	-	-	1	1	2	7	2	3	
<i>Epilobium angustifolium</i>	-	10	37	28	26	20	20	35	22	
<i>Goodyera oblongifolia</i>	1	-	-	-	-	-	-	-	-	
<i>Pyrola chlorantha</i>	1	-	-	-	-	-	-	-	-	
<i>Viola orbiculata</i>	2	-	-	-	-	-	-	-	-	
Misc. herbs	6	2	2	1	2	3	4	2	3	
Total herbs	14	16	51	38	32	26	31	47	33	

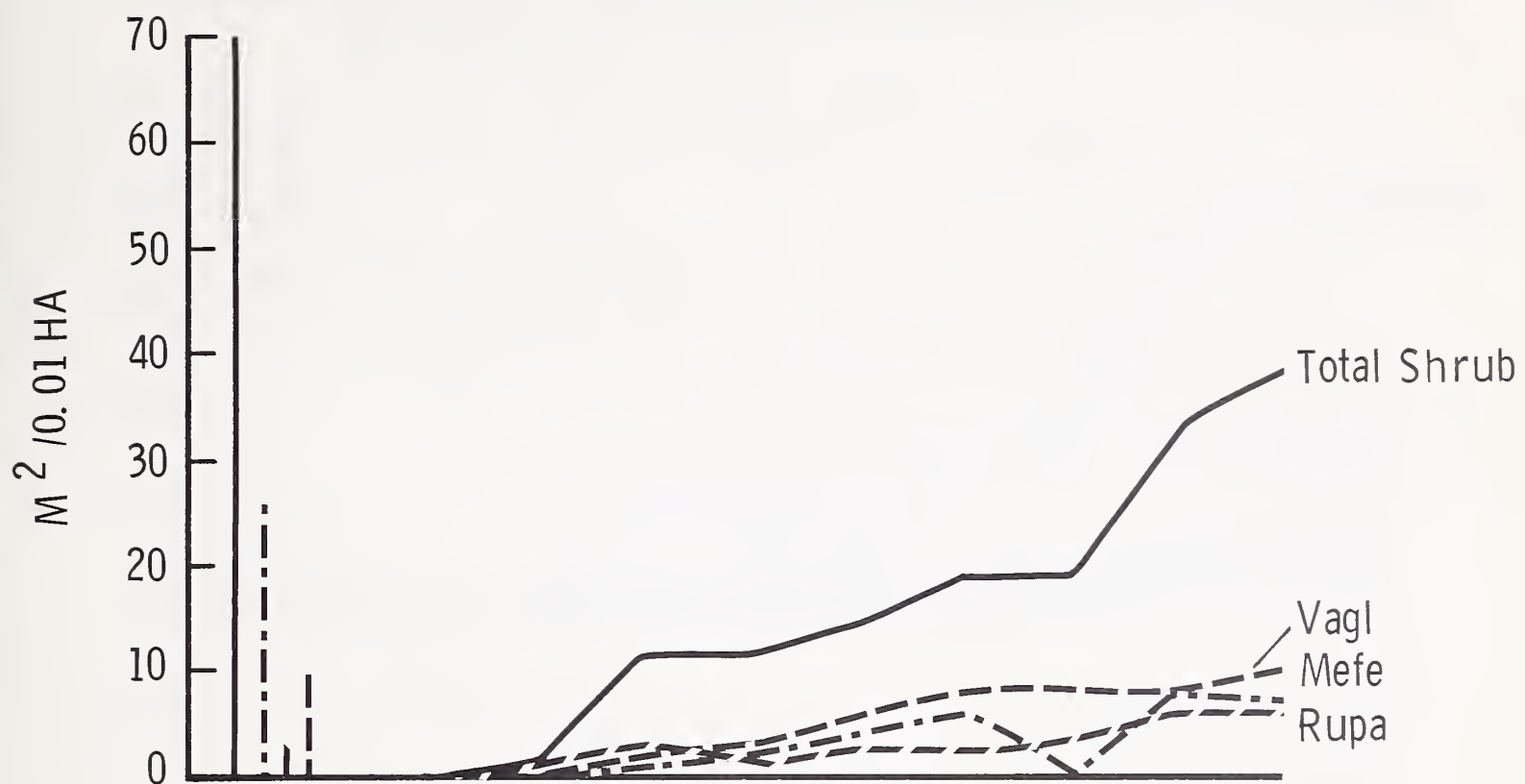


Figure 3-3. Shrub cover.

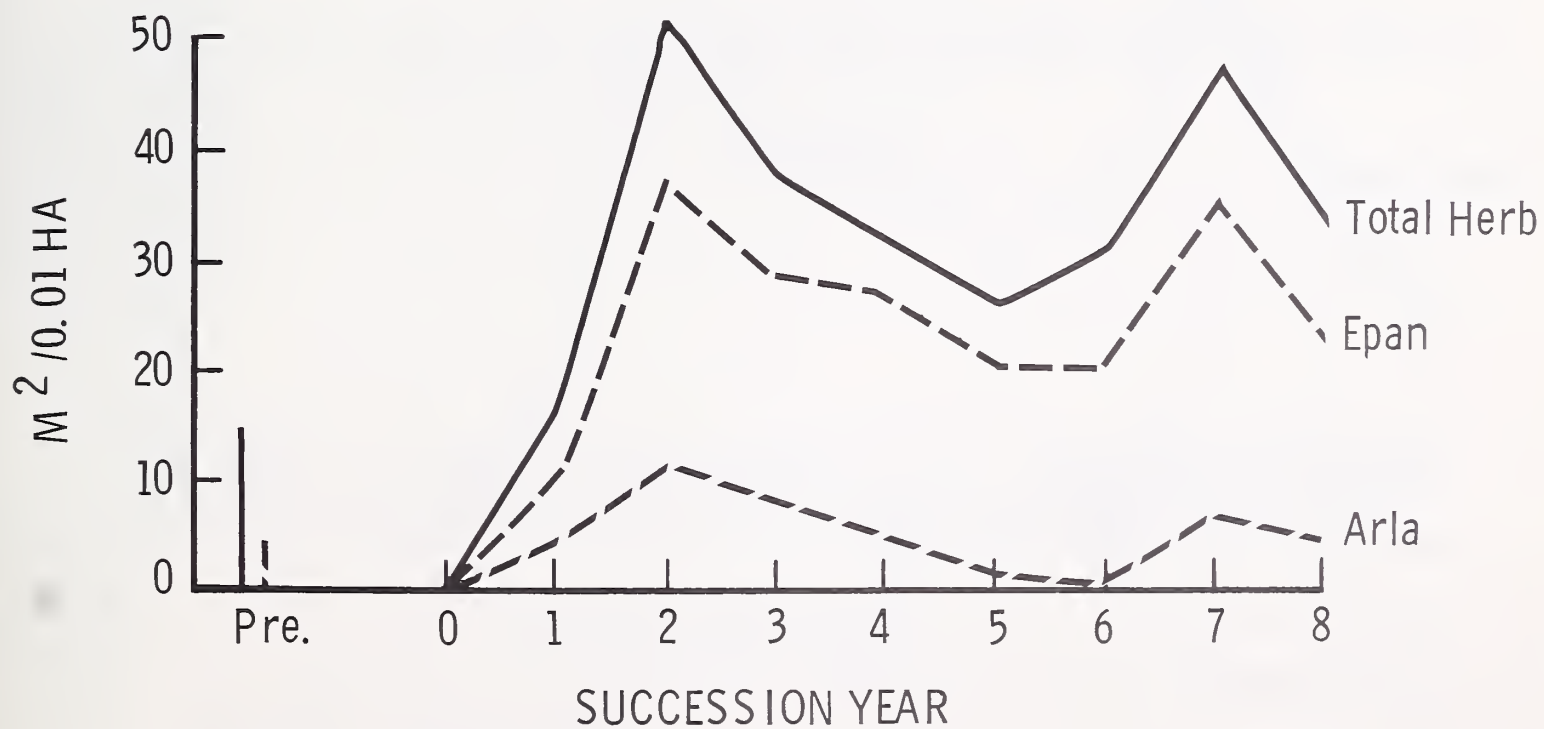


Figure 3-4. Herb cover.

Table 3-5.--Volume development of shrub component ($m^3/0.01$ ha), fig. 3-5.

Species	Pre	Succession year								
		1	2	3	4	5	6	7	8	
Alnus sinuata	13.9	-	-	-	-	-	-	-	-	-
Lonicera utahensis	.1	-	1.3	1.4	1.0	0.7	4.5	3.6	3.7	
Menziesia ferruginea	36.3	-	.6	1.4	2.5	4.7	-	6.9	7.5	
Pachistima myrsinites	.5	-	-	-	-	-	.1	.9	1.8	
Ribes lacustre	-	-	-	-	-	.7	-	.2	1.8	
Rosa gymnocarpa	-	<0.1	-	-	-	-	-	-	-	
Rubus parviflorus	.2	.2	1.5	.2	.5	.8	.8	1.8	2.0	
Salix scouleriana	-	-	-	-	-	-	-	.3	.5	
Sambucus racemosa	-	-	1.1	1.0	.2	-	-	.4	-	
Taxus brevifolia	51.5	-	-	-	-	-	-	-	-	
Vaccinium globulare	5.6	-	.2	1.0	.9	1.1	1.2	2.6	2.9	
Total shrubs	108.1	.2	4.8	5.0	5.2	8.0	6.6	16.7	19.0	

Table 3-6.--Volume development of herb component ($m^3/0.01$ ha), fig. 3-6.

Species	:	Succession year																
		Pre	:	1	:	2	:	3	:	4	:	5	:	6	:	7	:	8
Arnica latifolia		0.3		0.4		4.3		1.3		0.4		0.1		-		1.5		0.5
Chimaphila umbellata		.1		-		-		-		-		-		-		-		-
Clintonia uniflora		-		-		-		<.1		<.1		.1		4.0		.2		.3
Epilobium angustifolium		-		4.7		21.1		15.5		15.0		11.8		9.9		24.3		13.5
Goodyera oblongifolia		<.1		-		-		-		-		-		-		-		-
Pyrola chlorantha		<.1		-		-		-		-		-		-		-		-
Viola orbiculata		.1		-		-		-		-		-		-		-		-
Misc. herbs		.4		.1		.6		.2		.7		.4		.5		.2		.6
Total herbs		1.0		5.2		26.1		17.2		16.1		12.4		14.3		26.3		14.9



Figure 3-5. Shrub volume.

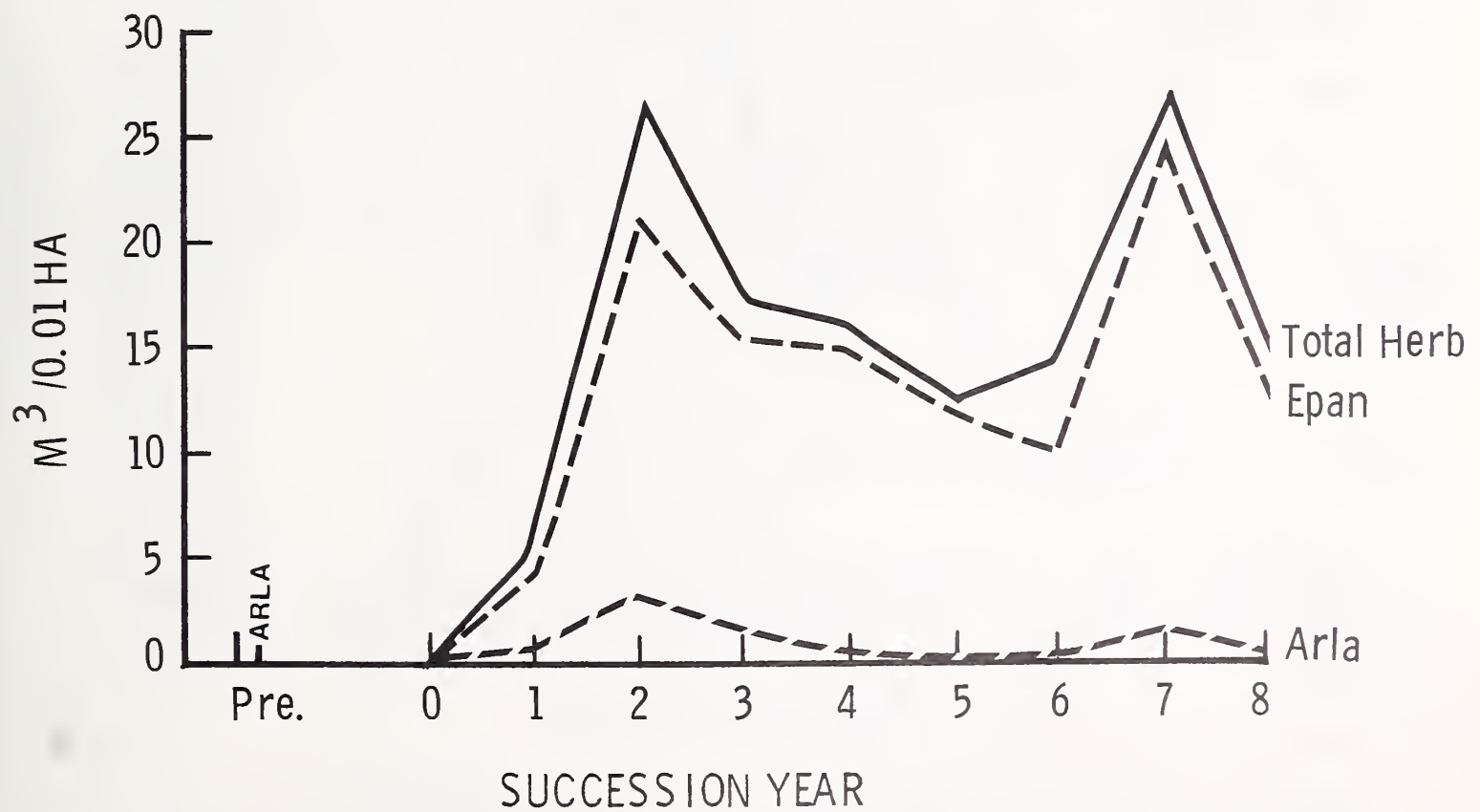


Figure 3-6. Herb volume.

MILLER CREEK: East-6 (1802-13 Area 11)

Site location and description: SW $\frac{1}{4}$ NW $\frac{1}{4}$ Sec. 20, T32N R24W MPM.

Elevation 4,750 ft; Exposure: Northeast (Az. 36°) Slope: 20%

Habitat type: *Abies lasiocarpa*/*Clintonia uniflora*, *Clintonia uniflora*
Phase

Predisturbance forest stand: Laoc 52%, Abia 38%, Pien 10% (Stand basal area: 2,945 cm²/0.01 ha)

Disturbance treatment: Logged June 1967; Slashed June 1967;

Broadcast burned: October 2, 1967 (Succession year 1:1968);

Fire intensity: 243 g water loss; Duff moisture: Upper 96%, Lower 70%; Postfire duff depth: 2.7 cm (51% of preburn depth)

Table 4-1.--Successional development of vegetative cover
(m²/0.01 ha or %), fig. 4-1.

Life-form component	Succession year									
	Pre	1	2	3	4	5	6	7	8	9
Tree	-	-	-	-	-	-	-	1	1	6
Shrub	113	1	-	2	2	3	5	14	21	23
Herb	25	42	52	49	33	32	27	27	43	37
Total veg.	138	43	52	51	35	35	31	41	65	65

Exposed ground surface:

Bare ground	-	6	3	7	1	1	1	-	2	-
Rock	-	-	1	1	1	-	2	-	1	1
Litter	44	50	41	34	45	44	47	34	23	23
Moss	22	1	3	8	18	20	18	28	20	24

Table 4-2.--Successional development of vegetative volume
(m³/0.01 ha), fig. 4-2.

Life-form component	Succession year									
	Pre	1	2	3	4	5	6	7	8	9
Tree	-	-	-	-	-	-	-	0.4	0.1	6.1
Shrub	218.2	0.1	-	0.3	0.4	0.8	1.6	5.9	12.4	13.4
Herb	3.1	7.3	26.9	28.4	14.5	16.4	8.8	9.1	17.6	14.8
Total veg.	221.3	7.4	26.9	28.7	15.0	17.2	10.4	15.4	30.2	34.3



Figure 4-1. Vegetative cover.

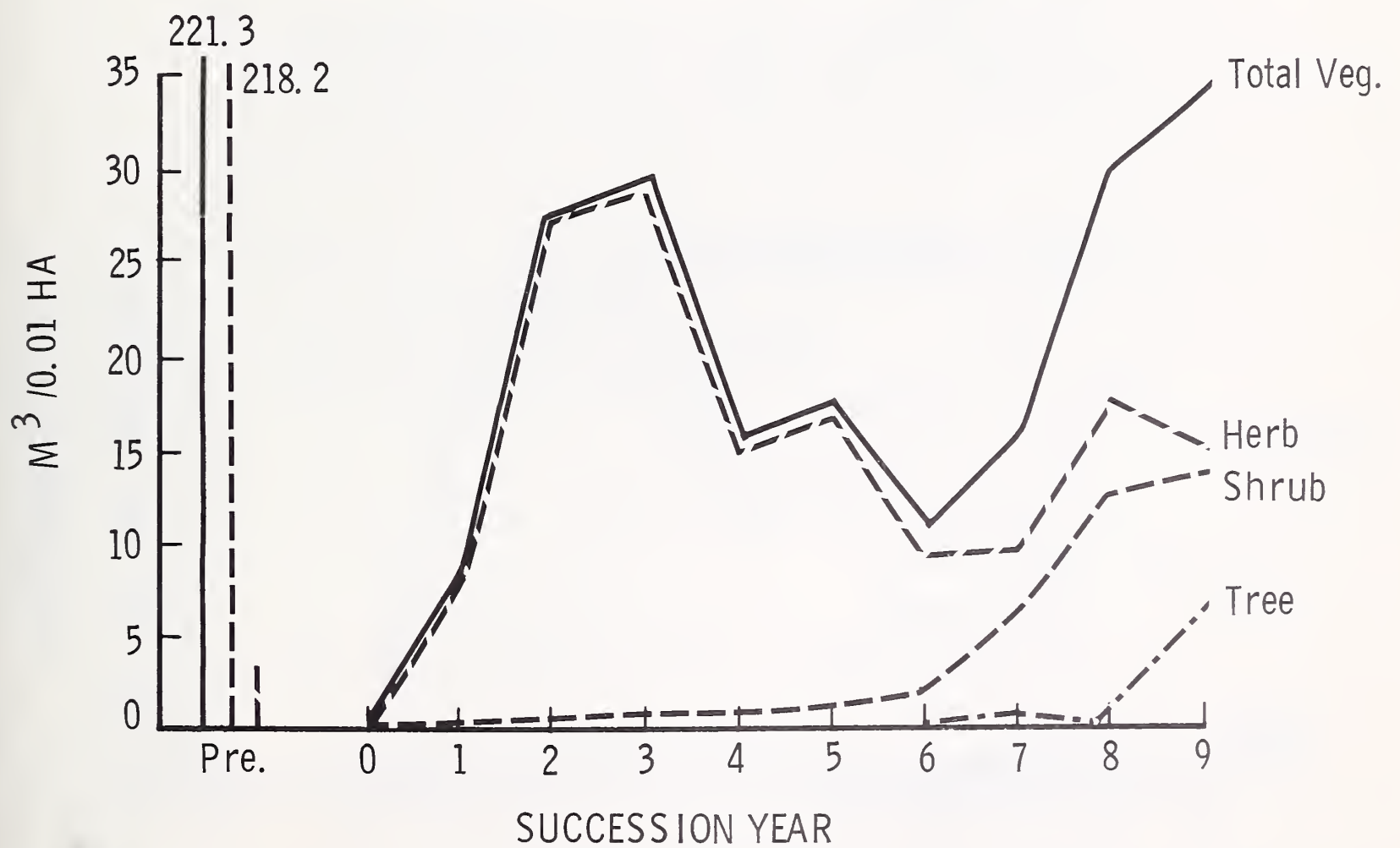


Figure 4-2. Vegetative volume.

Table 4-3.--Cover development of shrub component
(m²/0.01 ha or %), fig. 4-3.

Species	Succession year									
	Pre	1	2	3	4	5	6	7	8	9
<i>Acer glabrum</i>	5	-	-	-	-	-	-	-	-	-
<i>Alnus sinuata</i>	7	-	-	-	-	-	-	-	-	-
<i>Lonicera utahensis</i>	-	-	-	-	-	-	-	1	2	2
<i>Menziesia ferruginea</i>	5	-	-	-	-	-	-	-	-	-
<i>Pachistima myrsinites</i>	1	-	-	-	-	-	-	-	1	2
<i>Ribes viscosissimum</i>	-	-	-	-	-	-	-	2	-	<1
<i>Rubus parviflorus</i>	-	-	-	-	-	-	-	1	2	2
<i>Salix scouleriana</i>	-	-	-	-	<1	<1	1	4	6	7
<i>Sorbus scopulina</i>	6	-	-	-	-	-	-	-	-	-
<i>Symphoricarpos albus</i>	-	-	-	-	-	-	-	-	-	<1
<i>Taxus brevifolia</i>	63	-	-	-	-	-	-	-	-	-
<i>Vaccinium globulare</i>	26	1	-	2	2	2	3	7	10	10
Total shrubs	113	1	-	2	2	3	5	14	21	23

Table 4-4.--Cover development of herb component
(m²/0.01 ha or %), fig. 4-4.

Species	Succession year									
	Pre	1	2	3	4	5	6	7	8	9
<i>Anaphalis margaritaceae</i>	-	-	-	-	-	-	-	2	5	5
<i>Antennaria racemosa</i>	-	-	-	-	-	-	-	1	-	2
<i>Arnica latifolia</i>	12	2	3	5	4	1	-	1	1	1
<i>Cirsium vulgare</i>	-	-	-	-	-	-	-	2	2	1
<i>Clintonia uniflora</i>	1	-	-	1	1	1	1	1	1	1
<i>Epilobium angustifolium</i>	-	41	47	42	27	30	17	17	27	21
<i>Erigeron acris</i>	-	-	-	-	-	-	1	-	-	1
<i>Gnaphalium viscosum</i>	-	-	-	-	-	-	1	-	-	-
<i>Hieracium albiflorum</i>	-	-	-	-	-	-	-	1	-	2
<i>Linnaea borealis</i>	-	-	-	-	-	-	1	-	1	1
<i>Thalictrum occidentale</i>	1	-	-	-	-	-	-	-	-	-
<i>Viola orbiculata</i>	2	-	-	-	-	-	-	-	-	-
Misc. herbs	10	-	1	1	2	1	6	2	6	3
Total herbs	25	42	52	49	33	32	27	27	43	37



Figure 4-3. Shrub cover.

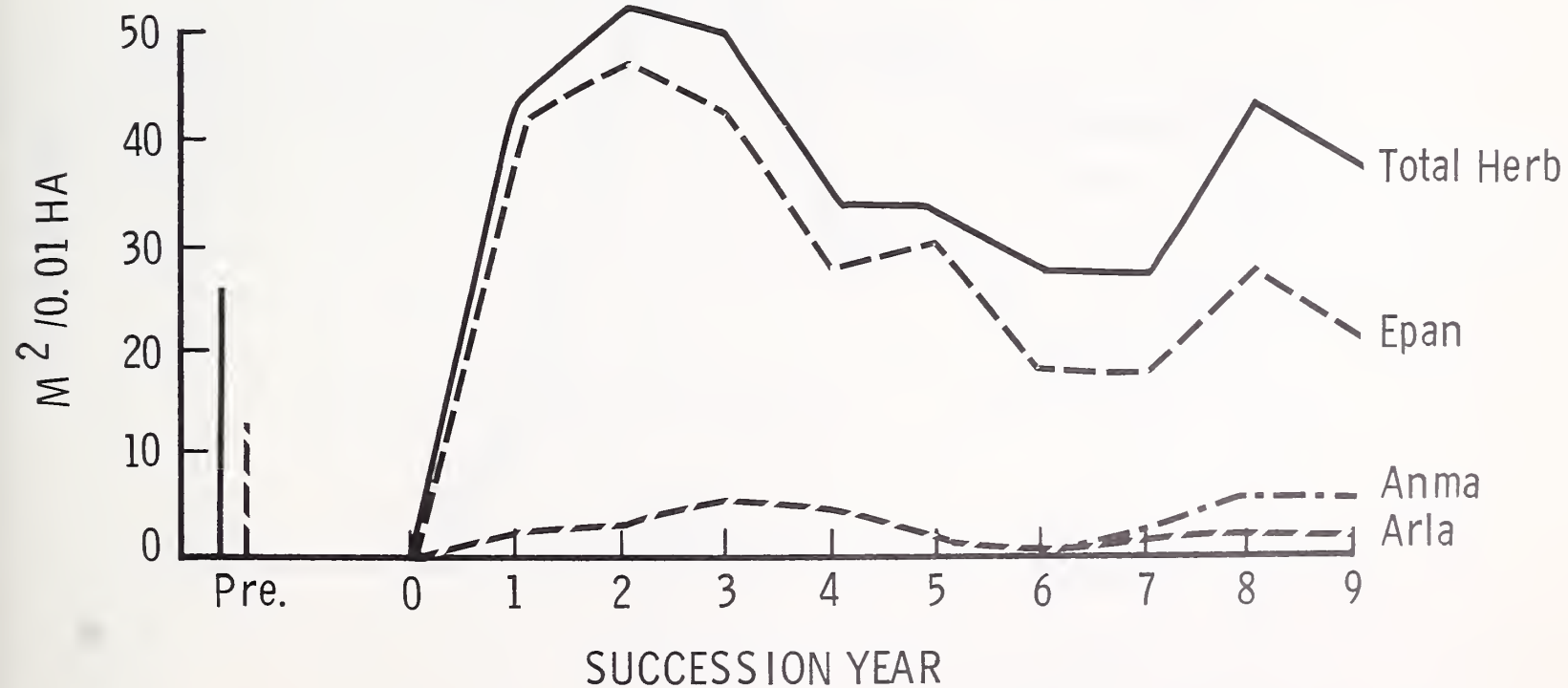


Figure 4-4. Herb cover.

Table 4-5.--Volume development of shrub component (m³/0.01 ha), fig. 4-5.

Species	Succession year										
	Pre	1	2	3	4	5	6	7	8	9	
Acer glabrum	16.2	-	-	-	-	-	-	-	-	-	
Alnus sinuata	22.7	-	-	-	-	-	-	-	-	-	
Lonicera utahensis	-	-	-	-	-	-	-	0.4	1.0	1.5	
Menziesia ferruginea	7.3	-	-	-	-	-	-	-	-	-	
Pachistima myrsinites	.1	-	-	-	-	-	-	-	.7	1.0	
Ribes viscosissimum	-	-	-	-	-	-	-	.8	-	.1	
Rubus parviflorus	-	-	-	-	-	-	-	.3	.6	.2	
Salix scouleriana	-	-	-	-	0.1	0.1	0.9	3.0	6.8	8.0	
Sorbus scopulina	19.5	-	-	-	-	-	-	-	-	-	
Symphoricarpos albus	-	-	-	-	-	-	-	-	-	<.1	
Taxus brevifolia	136.6	-	-	-	-	-	-	-	-	-	
Vaccinium globulare	15.8	0.1	-	0.3	.3	.6	.8	1.4	3.3	2.5	
Total shrubs	218.2	.1	-	.3	.4	.8	1.6	5.9	12.4	13.4	

Table 4-6.--Volume development of herb component (m³/0.01 ha), fig. 4-6.

Species	Succession year										
	Pre	1	2	3	4	5	6	7	8	9	
Anaphalis margaritaceae	-	-	-	-	-	-	-	0.4	1.8	1.7	
Antennaria racemosa	-	-	-	-	-	-	-	<.1	-	.7	
Arnica latifolia	1.7	0.1	0.7	0.5	0.2	0.1	-	.2	.2	.1	
Cirsium vulgare	-	-	-	-	-	-	-	.2	.6	.4	
Clintonia uniflora	<.1	-	-	<.1	<.1	<.1	0.1	.1	<.1	<.1	
Epilobium angustifolium	-	7.2	26.1	27.7	14.0	16.1	7.3	7.4	14.2	11.2	
Erigeron acris	-	-	-	-	-	-	.4	-	-	<.1	
Gnaphalium viscosum	-	-	-	-	-	-	.2	-	-	-	
Hieracium albiflorum	-	-	-	-	-	-	-	.1	-	.2	
Linnaea borealis	-	-	-	-	-	-	<.1	-	<.1	<.1	
Thalictrum occidentale	.2	-	-	-	-	-	-	-	-	-	
Viola orbiculata	.1	-	-	-	-	-	-	-	-	-	
Misc. herbs	1.2	-	.1	.1	.2	.2	.8	.7	.8	.5	
Total herbs	3.1	7.3	26.9	28.4	14.5	16.4	8.8	9.1	17.6	14.8	



Figure 4-5. Shrub volume.

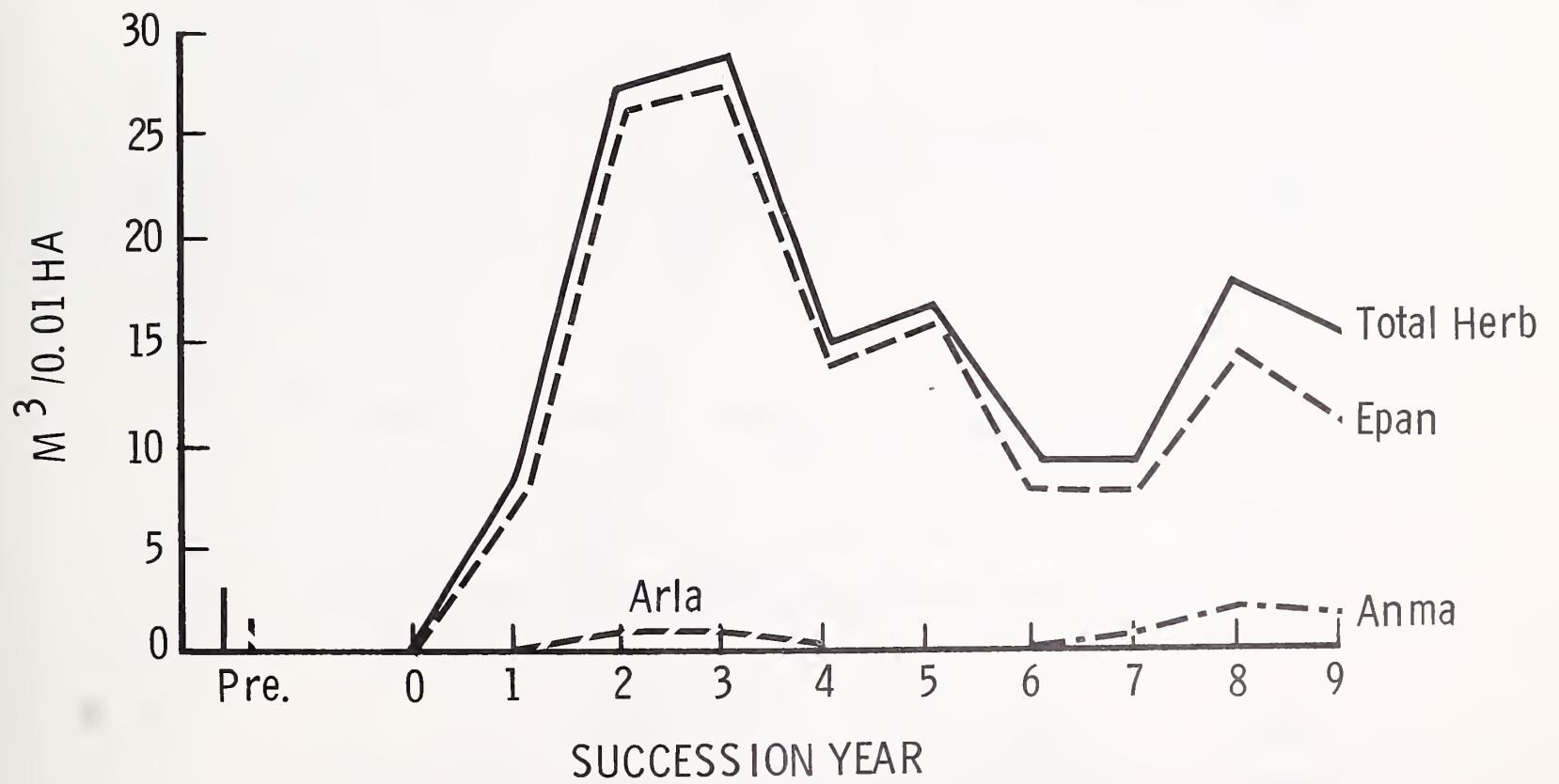


Figure 4-6. Herb volume.

MILLER CREEK: East-8 (1802-13 Area 21-1)

Site location and description: NW $\frac{1}{4}$ NW $\frac{1}{4}$ Sec. 16, T32N R24W MPM.

Elevation: 4,700 ft; Exposure: Southeast (Az. 126°); Slope: 10%

Habitat type: *Abies lasiocarpa*/*Clintonia uniflora*, *Menziesia ferruginea* Phase

Predisturbance forest stand: Pien 60%, *Abla* 22%, Pico 9%, Psme 6%,
Laoc 3% (Stand basal area 3,568 cm²/0.01 ha)

Disturbance treatment: Logged November 1967; Slashed December 1967;

Broadcast-burned: October 1, 1970 (Succession year 1:1971);

Fire intensity: 881 g water loss; Duff moisture: Upper --%,
Lower --%; Postfire duff depth: 6.6 cm (69% of preburn depth)

Table 5-1.--Successional development of vegetative cover
(m²/0.01 ha or %), fig. 5-1.

Life-form component	Succession year						
	Pre	1	2	3	4	5	6
Tree	-	-	-	-	-	-	1
Shrub	98	2	3	11	6	12	12
Herb	55	57	62	41	67	61	60
Total veg.	153	59	66	52	72	73	73

Exposed ground surface:

Bare ground	-	7	5	4	4	3	2
Rock	-	-	-	1	-	-	-
Litter	18	32	26	35	17	18	25
Moss	2	2	3	10	8	10	5

Table 5-2.--Successional development of vegetative volume
(m³/0.01 ha), fig. 5-2.

Life-form component	Succession year						
	Pre	1	2	3	4	5	6
Tree	-	-	-	-	-	-	0.5
Shrub	142.2	0.3	0.8	3.6	1.7	5.2	5.4
Herb	9.7	17.5	22.9	16.7	20.5	18.2	19.5
Total veg.	151.9	17.9	23.6	20.3	22.2	23.4	25.4

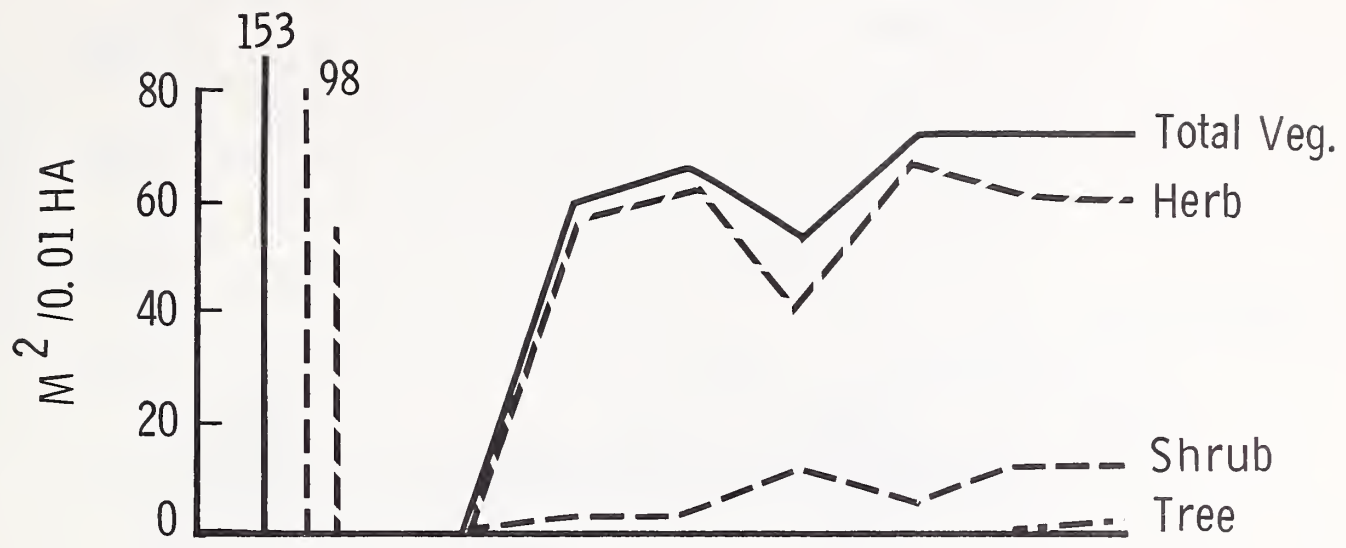


Figure 5-1. Vegetative cover.

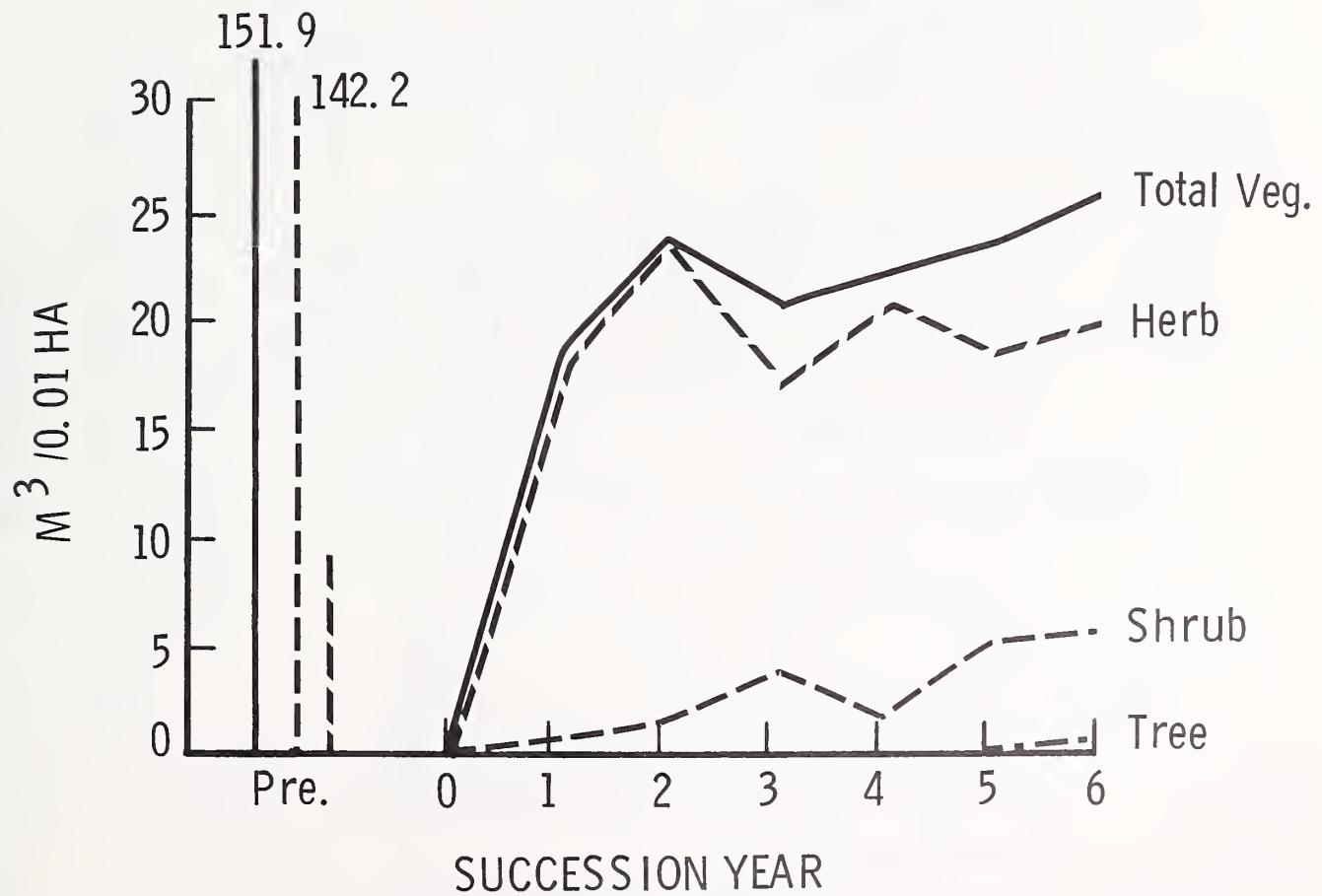


Figure 5-2. Vegetative volume.

Table 5-3.--Cover development of shrub component
(m²/0.01 ha or %), fig. 5-3.

Species	Succession year						
	Pre	1	2	3	4	5	6
<i>Acer glabrum</i>	<1	-	-	-	-	-	-
<i>Alnus sinuata</i>	5	-	-	-	-	-	-
<i>Amelanchier alnifolia</i>	2	1	-	-	-	2	1
<i>Menziesia ferruginea</i>	17	-	-	-	-	-	-
<i>Pachistima myrsinites</i>	2	-	-	-	-	-	-
<i>Ribes lacustre</i>	1	-	-	-	-	-	-
<i>Rosa gymnocarpa</i>	4	1	2	4	4	8	8
<i>Rubus parviflorus</i>	1	-	1	1	-	1	1
<i>Sorbus scopulina</i>	-	-	-	<1	-	-	-
<i>Spiraea betulifolia</i>	1	-	-	2	2	1	2
<i>Symphoricarpos albus</i>	-	-	-	2	-	-	-
<i>Taxus brevifolia</i>	36	-	-	-	-	-	-
<i>Vaccinium globulare</i>	28	-	-	-	-	-	-
Total shrubs	98	2	3	10	6	12	12

Table 5-4.--Cover development of herb component
(m²/0.01 ha or %), fig. 5-4.

Species	Succession year						
	Pre	1	2	3	4	5	6
<i>Adenocaulon bicolor</i>	-	2	1	-	1	1	-
<i>Arnica latifolia</i>	38	17	23	8	23	19	12
<i>Berberis repens</i>	-	-	-	1	2	2	2
<i>Carex concinnoides</i>	-	-	-	-	-	-	2
<i>Clintonia uniflora</i>	-	-	-	-	-	-	1
<i>Epilobium angustifolium</i>	-	31	28	21	32	26	27
<i>Geranium bicknellii</i>	-	3	-	-	-	-	-
<i>Linnaea borealis</i>	1	-	-	-	-	-	-
<i>Thalictrum occidentale</i>	-	2	3	4	2	4	3
<i>Xerophyllum tenax</i>	10	1	2	5	5	6	7
Misc. herbs	6	2	4	2	1	2	5
Total herbs	55	57	62	41	67	61	60



Figure 5-3. Shrub cover.

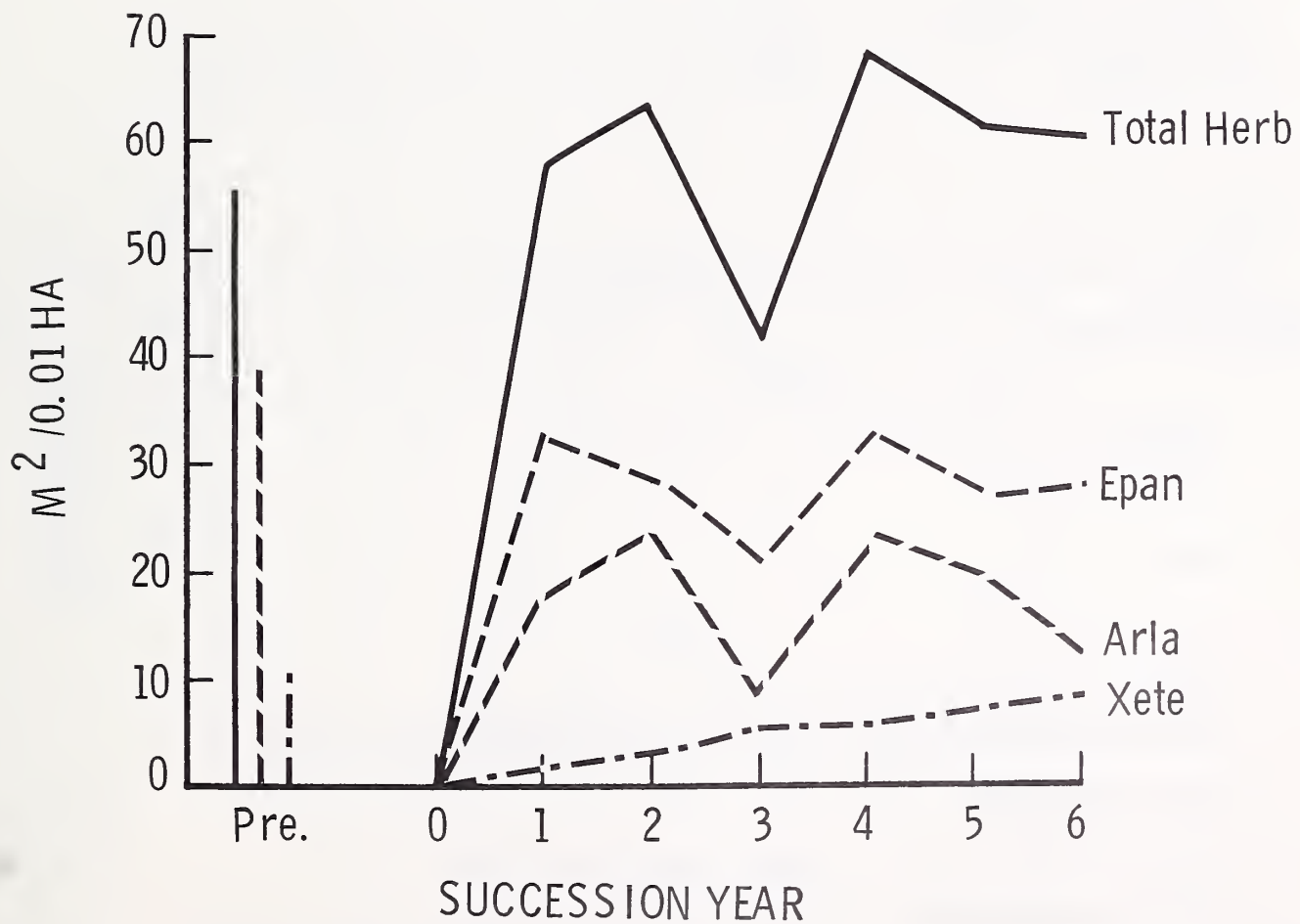


Figure 5-4. Herb cover.

Table 5-5.--Volume development of shrub component ($m^3/0.01$ ha), fig. 5-5.

Species	Succession year							
	Pre	1	2	3	4	5	6	
Acer glabrum	1.4	-	-	-	-	-	-	
Alnus sinuata	14.2	-	-	-	-	-	-	
Amelanchier alnifolia	3.3	0.2	-	-	-	1.2	0.2	
Menziesia ferruginea	24.2	-	-	-	-	-	-	
Pachistima myrsinites	.6	-	-	-	-	-	-	
Ribes lacustre	.7	-	-	-	-	-	-	
Rosa gymnocarpa	1.5	.1	0.5	1.2	1.2	3.6	4.4	
Rubus parviflorus	.3	-	.2	.1	-	.2	.1	
Sorbus scopulina	-	-	-	.1	-	-	-	
Spiraea betulifolia	.4	-	-	.6	.5	.2	.7	
Symphoricarpos albus	-	-	-	1.6	-	-	-	
Taxus brevifolia	80.9	-	-	-	-	-	-	
Vaccinium globulare	14.9	-	-	-	-	-	-	
Total shrubs	142.2	.3	.8	3.6	1.7	5.2	5.4	

Table 5-6.--Volume development of herb component ($m^3/0.01$ ha), fig. 5-6.

Species	Succession year							
	Pre	1	2	3	4	5	6	
Adenocaulon bicolor	-	0.4	0.2	-	0.2	0.1	-	
Arnica latifolia	6.7	1.7	5.5	0.9	2.8	2.2	1.1	
Berberis repens	-	-	-	<.1	.3	.2	.2	
Carex concinnoides	-	-	-	-	-	-	.1	
Clintonia uniflora	-	-	-	-	-	-	.1	
Epilobium angustifolium	-	14.5	14.5	13.7	15.8	12.6	13.9	
Geranium bicknellii	-	.2	-	-	-	-	-	
Linnaea borealis	<.1	-	-	-	-	-	-	
Thalictrum occidentale	-	.4	1.4	1.0	.3	.9	1.4	
Xerophyllum tenax	2.4	.1	.5	1.0	.9	1.9	1.5	
Misc. herbs	.5	.3	.8	.2	.1	.3	1.2	
Total herbs	9.7	17.5	22.9	16.7	20.5	18.2	19.5	



Figure 5-5. Shrub volume.

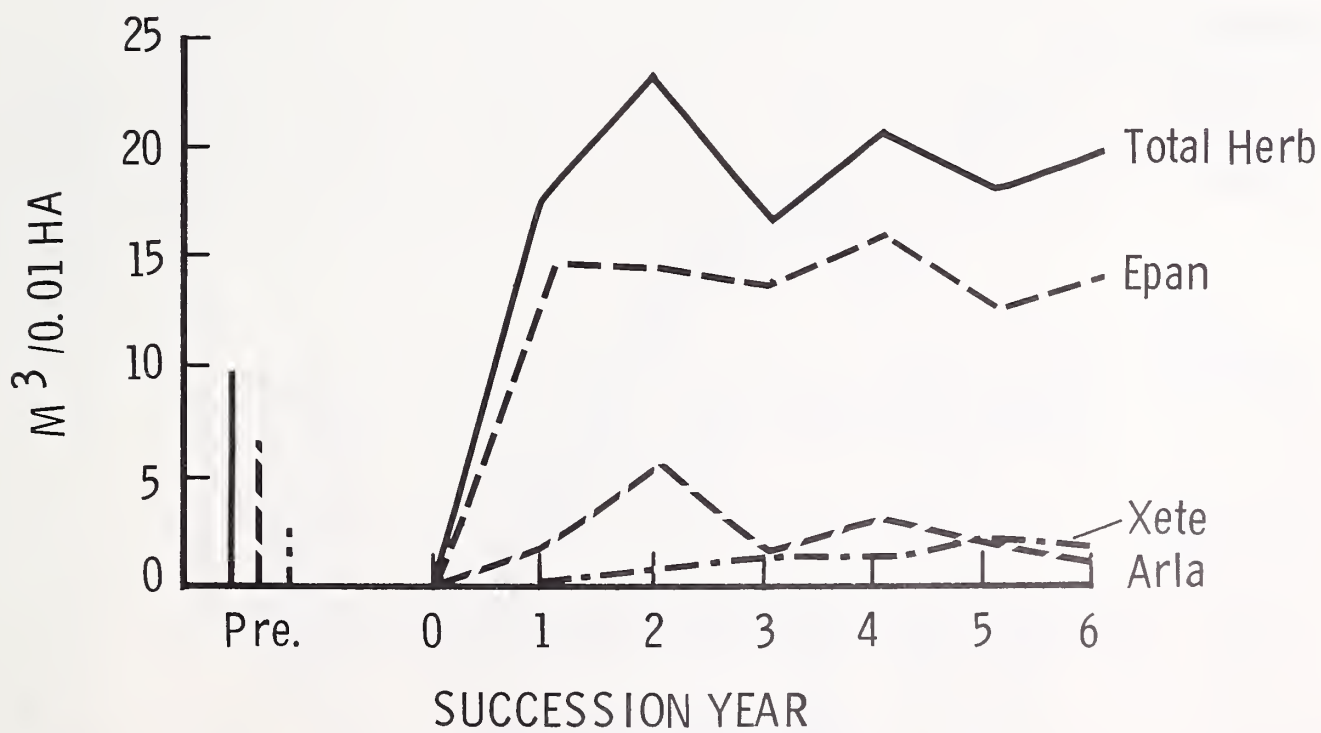


Figure 5-6. Herb volume.

MILLER CREEK: East-9 (1802-13 Area 21-3)

Site location and description: NW $\frac{1}{4}$ NW $\frac{1}{4}$ Sec. 16, T32N R24W MPM.

Elevation: 4,700 ft; Exposure: East (Az. 106°); Slope: 15%

Habitat type: *Abies lasiocarpa*/*Clintonia uniflora*, *Xerophyllum tenax* Phase

Predisturbance forest stand: Laoc 53%, Abia 22%, Psme 14%, Pico 11%
(Stand basal area 6,747 cm²/0.01 ha)

Disturbance treatment: Logged November 1967; Slashed December 1967;
Broadcast-burned: October 1, 1970 (Succession year 1:1971)

Fire intensity: 834 g water loss; Duff moisture: Upper --%,
Lower --%; Postfire duff depth: 4.7 cm (62% of preburn depth)

Table 6-1.--Successional development of vegetative cover
(m²/0.01 ha or %), fig. 6-1.

Life-form component	Succession year												
	Pre	:	1	:	2	:	3	:	4	:	5	:	6
Tree	1		-		-		-		-		-		-
Shrub	36		2		7		3		11		28		22
Herb	48		34		47		52		47		42		42
Total veg.	85		37		54		56		57		71		64
Exposed ground surface:													
Bare ground	-		13		2		5		2		1		2
Rock	-		1		-		-		1		1		1
Litter	40		33		37		35		29		22		29
Moss	2		16		8		5		12		14		8

Table 6-2.--Successional development of vegetative volume
(m³/0.01 ha), fig. 6-2.

Life-form component	Succession year							
	Pre	1	2	3	4	5	6	
Tree	0.3	-	-	-	-	-	-	
Shrub	99.8	0.6	1.9	0.8	3.4	10.4	12.8	
Herb	10.1	7.3	15.3	18.4	12.7	13.3	14.0	
Total veg.	110.2	8.0	17.2	19.2	16.1	23.8	26.8	



Figure 6-1. Vegetative cover.

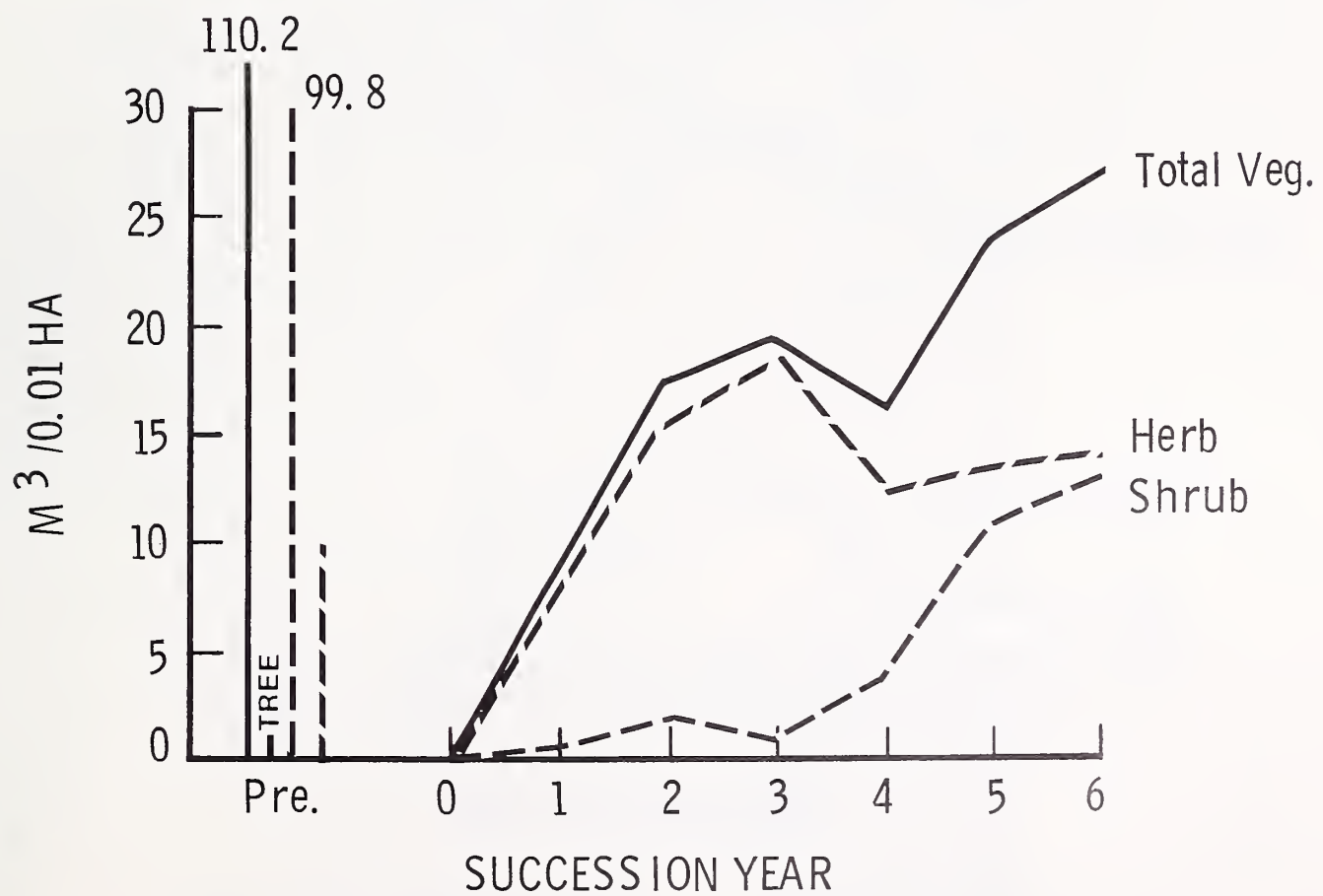


Figure 6-2. Vegetative volume.

Table 6-3.--Cover development of shrub component
(m²/0.01 ha or %), fig. 6-3.

Species	Succession year						
	Pre	1	2	3	4	5	6
<i>Acer glabrum</i>	16	-	-	-	-	-	3
<i>Alnus sinuata</i>	1	-	-	-	-	-	-
<i>Rosa gymnocarpa</i>	6	-	2	3	6	12	8
<i>Rubus parviflorus</i>	-	-	2	-	2	2	2
<i>Salix scouleriana</i>	-	-	-	-	-	1	-
<i>Sorbus scopulina</i>	<1	-	-	-	-	-	<1
<i>Spiraea betulifolia</i>	1	1	1	-	-	6	5
<i>Symphoricarpos albus</i>	2	2	2	-	3	8	4
<i>Taxus brevifolia</i>	1	-	-	-	-	-	-
<i>Vaccinium globulare</i>	8	-	-	-	-	1	-
Total shrubs	36	2	7	3	11	28	22

Table 6-4.--Cover development of herb component
(m²/0.01 ha or %), fig. 6-4.

Species	Succession year						
	Pre	1	2	3	4	5	6
<i>Adenocaulon bicolor</i>	-	-	-	1	-	-	-
<i>Arnica latifolia</i>	24	9	13	20	12	2	2
<i>Aster conspicuus</i>	-	-	-	-	-	1	1
<i>Berberis repens</i>	1	-	1	1	-	1	-
<i>Carex concinnoides</i>	-	-	-	-	2	4	4
<i>Carex rossii</i>	-	-	-	-	-	-	1
<i>Chimaphila umbellata</i>	1	-	-	-	-	-	-
<i>Cirsium arvense</i>	-	-	-	-	-	2	2
<i>Clintonia uniflora</i>	2	-	-	-	-	-	-
<i>Epilobium angustifolium</i>	-	17	22	23	19	17	17
<i>Epilobium watsonii</i>	-	-	1	-	-	-	-
<i>Geranium bicknellii</i>	-	2	-	-	-	-	-
<i>Gnaphalium viscosum</i>	-	-	-	-	-	1	1
<i>Thalictrum occidentale</i>	4	1	5	4	3	3	2
<i>Xerophyllum tenax</i>	10	2	2	3	6	8	8
Misc. herbs	7	3	2	-	4	3	4
Total herbs	48	34	47	52	47	42	42

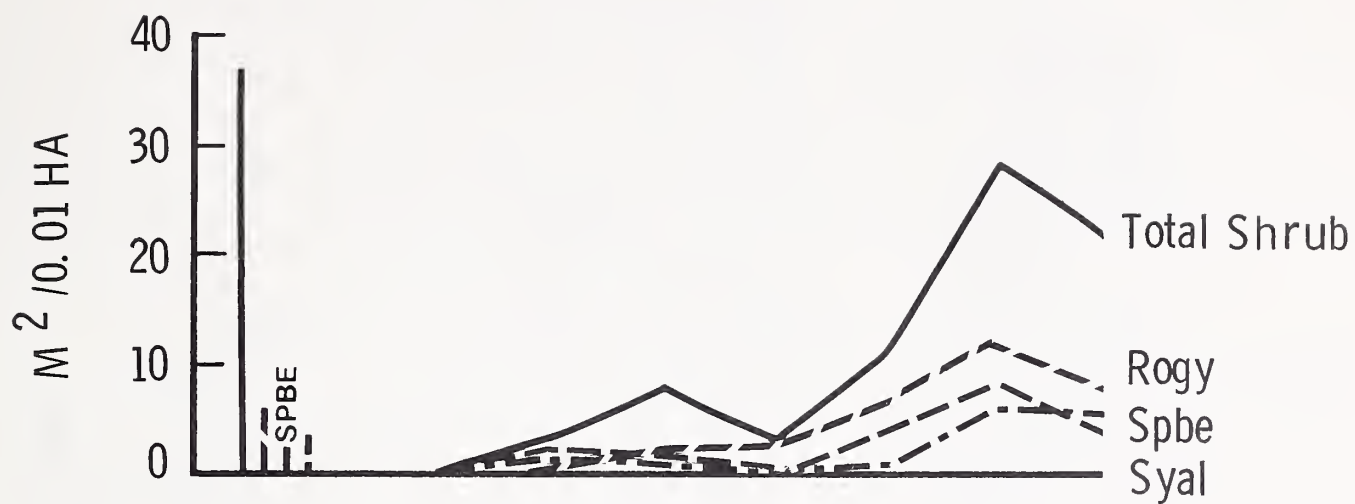


Figure 6-3. Shrub cover.

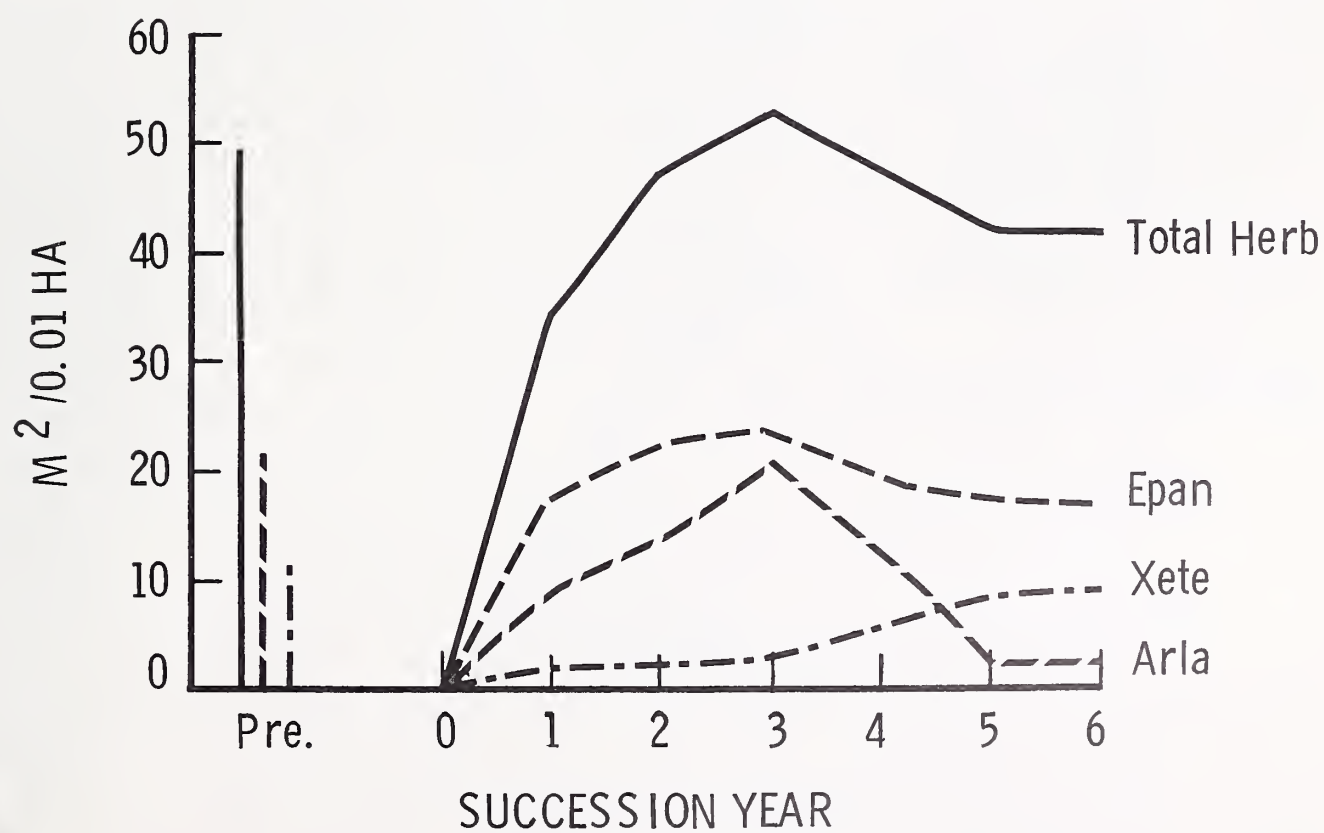


Figure 6-4. Herb cover.

Table 6-5.--Volume development of shrub component ($m^3/0.01$ ha), fig. 6-5.

Species	Succession year						
	Pre	1	2	3	4	5	6
<i>Acer glabrum</i>	89.1	-	-	-	-	-	7.0
<i>Alnus sinuata</i>	2.0	-	-	-	-	-	-
<i>Rosa gymnocarpa</i>	3.6	-	0.7	0.8	2.1	4.6	2.3
<i>Rubus parviflorus</i>	-	-	.3	-	.3	.2	.3
<i>Salix scouleriana</i>	-	-	-	-	-	.6	-
<i>Sorbus scopulina</i>	.2	-	-	-	-	-	.2
<i>Spiraea betulifolia</i>	.2	0.1	.2	-	-	1.4	1.4
<i>Symphoricarpos albus</i>	.9	.5	.7	-	1.1	3.5	1.5
<i>Taxus brevifolia</i>	.4	-	-	-	-	-	-
<i>Vaccinium globulare</i>	3.4	-	-	-	-	.1	-
Total shrubs	99.8	.6	1.9	.8	3.4	10.4	12.8

Table 6-6.--Volume development of herb component ($m^3/0.01$ ha), fig. 6-6.

Species	Succession year						
	Pre	1	2	3	4	5	6
<i>Adenocaulon bicolor</i>	-	-	-	0.1	-	-	-
<i>Arnica latifolia</i>	4.9	0.9	2.9	2.2	1.3	0.2	0.1
<i>Aster conspicuus</i>	-	-	-	-	-	.3	.2
<i>Berberis repens</i>	.2	-	<.1	.1	-	<.1	-
<i>Carex concinnoides</i>	-	-	-	-	.2	.4	.4
<i>Carex rossii</i>	-	-	-	-	-	-	.1
<i>Chimaphila umbellata</i>	.1	-	-	-	-	-	-
<i>Cirsium arvense</i>	-	-	-	-	-	1.0	.7
<i>Clintonia uniflora</i>	.1	-	-	-	-	-	-
<i>Epilobium angustifolium</i>	-	5.7	10.1	14.2	8.8	8.0	9.2
<i>Epilobium watsonii</i>	-	-	<.1	-	-	-	-
<i>Geranium bicknellii</i>	-	.1	-	-	-	-	-
<i>Gnaphalium viscosum</i>	-	-	-	-	-	.2	.2
<i>Thalictrum occidentale</i>	1.5	.1	1.3	1.1	.8	1.2	.5
<i>Xerophyllum tenax</i>	2.7	.2	.3	.7	.9	1.4	1.8
Misc. herbs	.5	.4	.5	-	.7	.4	.8
Total herbs	10.1	7.3	15.3	18.4	12.7	13.3	14.0

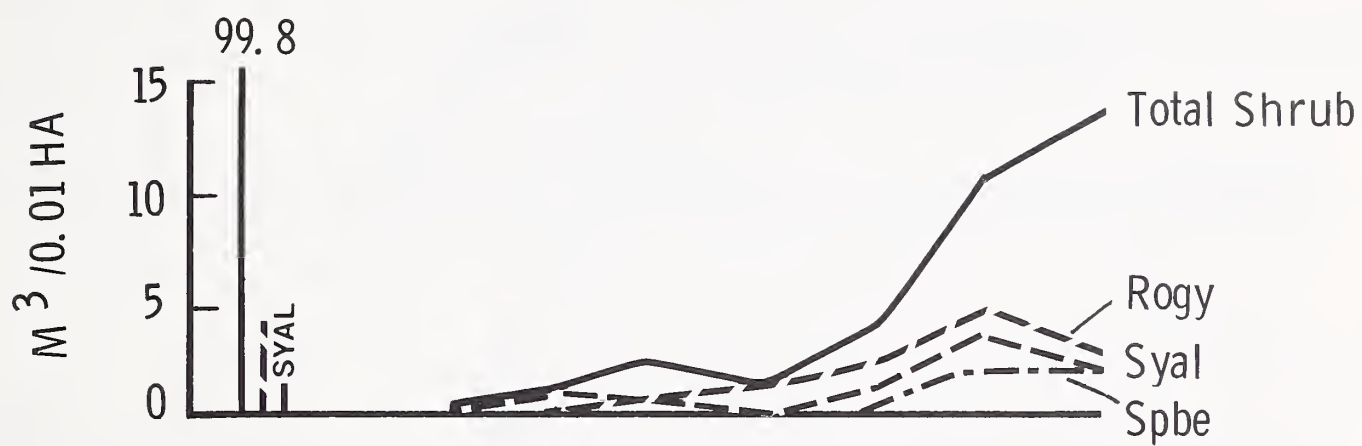


Figure 6-5. Shrub volume.

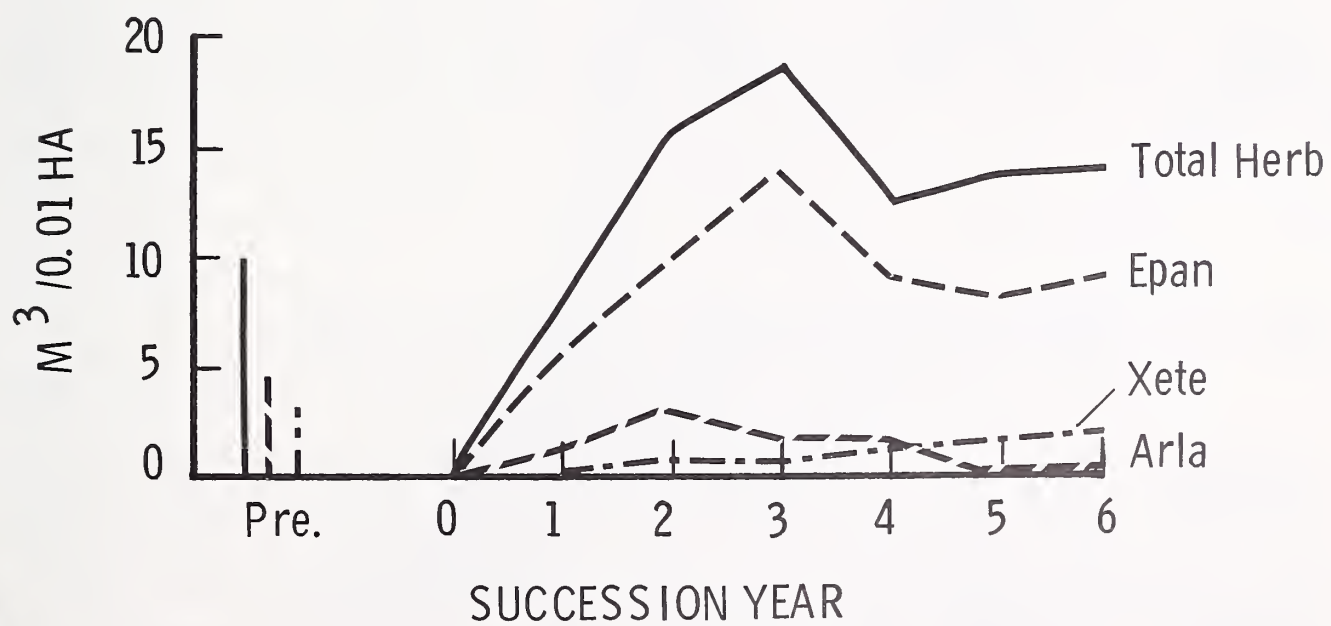


Figure 6-6. Herb volume.

MILLER CREEK: South-1 (1802-13 Area 12)

Site location and description: NE $\frac{1}{4}$ SE $\frac{1}{4}$ Sec. 19, T32N R24W MPM.

Elevation 4,900 ft; Exposure: Southwest (Az. 206°) Slope: 10%

Habitat type: *Abies lasiocarpa*/*Clintonia uniflora*, *Xerophyllum tenax*

Phase

Predisturbance forest stand: Pien 31%, Laoc 29%, Psme 27%, Pico 7%,

Abla 6% (Stand basal area: 5,324 cm²/0.01 ha)

Disturbance treatment: Logged June 1967; Slashed June 1967;

Broadcast burned: May 18, 1968 (Succession year 1:1968);

Fire intensity: 286 g water loss; Duff moisture: Upper 41%,

Lower 135%; Postfire duff depth: 4.3 cm (84% of preburn depth)

Table 7-1.--Successional development of vegetative cover
(m²/0.01 ha or %), fig. 7-1.

Life-form component	Succession year										
	Pre	1	2	3	4	5	6	7	8	9	
Tree	-	-	-	-	-	-	-	-	-	-	
Shrub	33	1	9	14	12	18	17	23	36	30	
Herb	44	10	25	61	56	45	47	49	50	43	
Total veg.	77	11	34	75	67	63	63	72	86	73	
Exposed ground surface:											
Bare ground	-	11	14	8	5	4	2	1	2	2	
Rock	-	-	-	-	-	-	1	-	1	-	
Litter	29	78	52	25	27	34	35	26	20	28	
Moss	8	-	-	-	3	6	4	9	7	8	

Table 7-2.--Successional development of vegetative volume
(m³/0.01 ha), fig. 7-2.

Life-form component	Succession year										
	Pre	1	2	3	4	5	6	7	8	9	
Tree	-	-	-	-	-	-	-	-	-	-	
Shrub	13.3	0.1	3.1	6.2	4.6	9.9	9.9	9.8	21.8	19.6	
Herb	5.6	.6	6.8	21.0	17.6	12.9	16.3	16.2	20.9	15.6	
Total veg.	18.9	.7	9.9	27.2	22.2	22.8	26.2	26.0	42.7	35.2	

MC: S-1 (A-12)

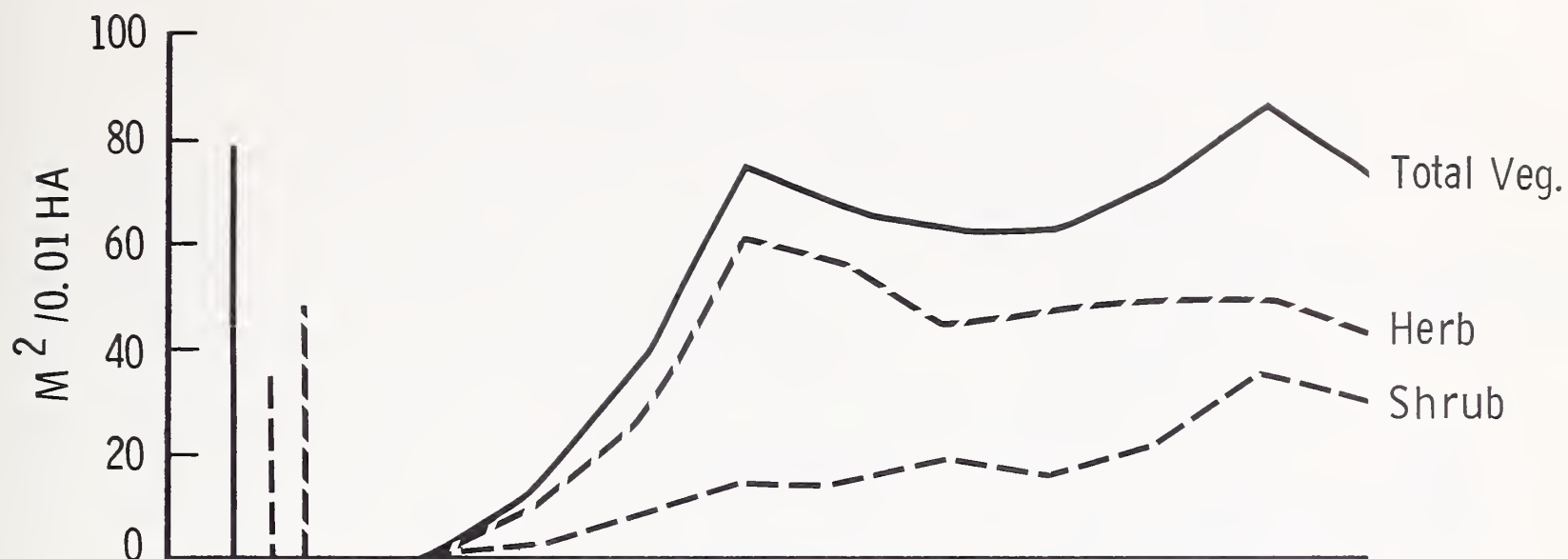


Figure 7-1. Vegetative cover.

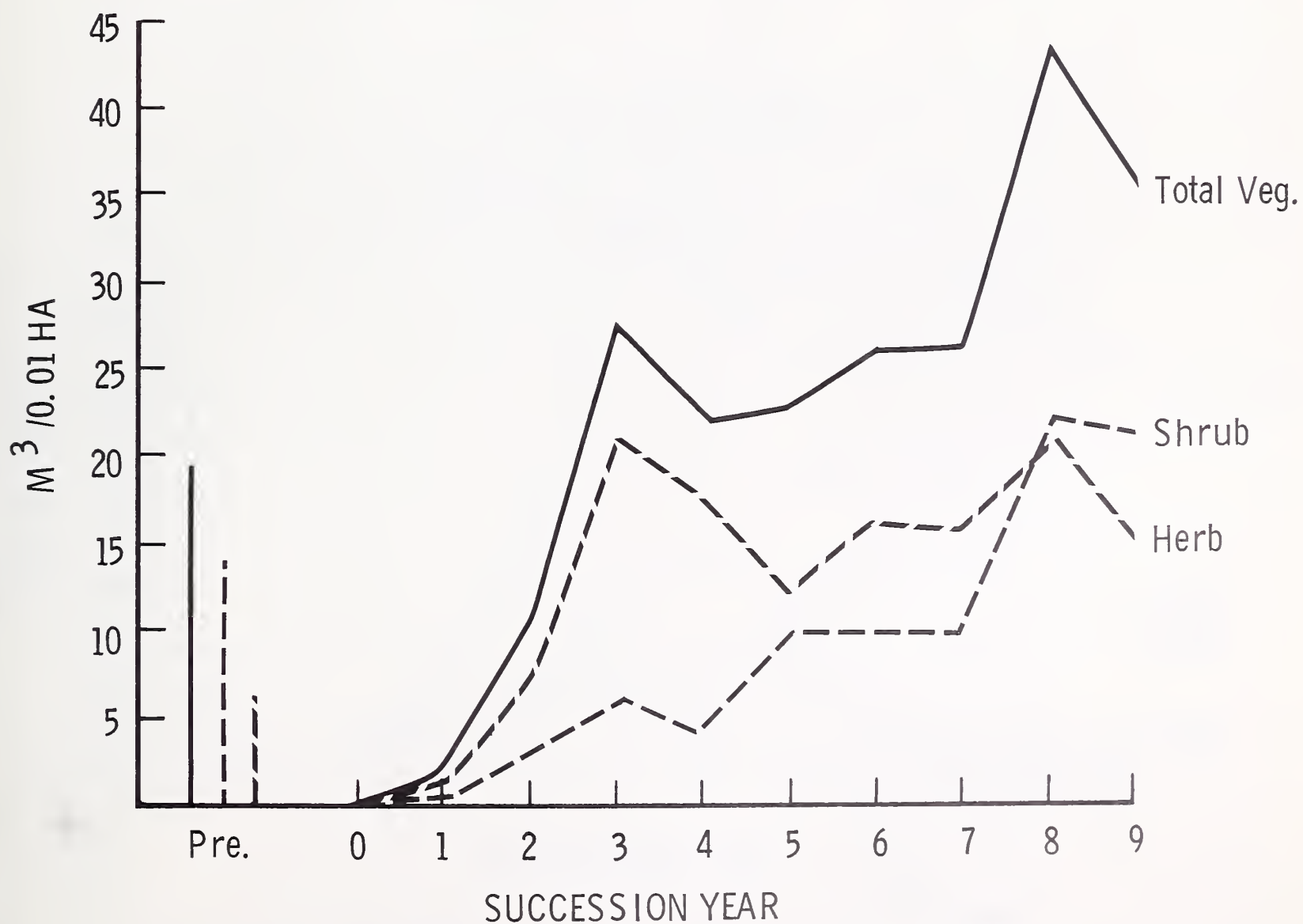


Figure 7-2. Vegetative volume.

MC: S-1 (A-12)

Table 7-3.--Cover development of shrub component
(m²/0.01 ha or %), fig. 7-3.

Species	Succession year									
	Pre	1	2	3	4	5	6	7	8	9
<i>Pachistima myrsinites</i>	1	-	-	-	-	-	-	1	3	3
<i>Ribes viscosissimum</i>	-	-	-	4	3	5	3	5	6	7
<i>Rosa gymnocarpa</i>	<1	-	<1	-	-	-	-	-	-	-
<i>Rubus parviflorus</i>	1	1	5	3	3	2	2	2	4	3
<i>Salix scouleriana</i>	-	-	1	2	2	5	4	3	6	4
<i>Spiraea betulifolia</i>	1	-	4	4	2	3	5	6	6	6
<i>Taxus brevifolia</i>	1	-	-	-	-	-	-	-	-	-
<i>Vaccinium globulare</i>	29	-	-	2	2	3	2	6	11	8
Total shrubs	33	1	9	14	12	18	17	23	36	30

Table 7-4.--Cover development of herb component
(m²/0.01 ha or %), fig. 7-4.

Species	Succession year									
	Pre	1	2	3	4	5	6	7	8	9
<i>Anaphalis margaritaceae</i>	-	-	-	-	-	-	2	2	2	1
<i>Arnica latifolia</i>	14	7	6	12	10	11	5	3	-	-
<i>Berberis repens</i>	<1	-	-	-	-	-	-	-	1	1
<i>Carex concinnoides</i>	-	-	-	-	-	-	-	-	1	2
<i>Chimaphila umbellata</i>	2	-	-	-	-	-	-	-	-	-
<i>Cirsium vulgare</i>	-	-	2	2	-	-	-	1	2	1
<i>Deschampsia elongata</i>	-	-	-	-	-	-	-	1	-	-
<i>Epilobium angustifolium</i>	-	-	6	18	22	17	20	23	27	17
<i>Epilobium paniculatum</i>	-	-	1	13	8	-	-	-	-	-
<i>Epilobium watsonii</i>	-	-	1	-	-	-	-	-	-	-
<i>Gnaphalium viscosum</i>	-	-	-	-	-	1	-	-	-	-
<i>Linnaea borealis</i>	2	-	-	1	2	1	1	1	1	1
<i>Viola orbiculata</i>	1	-	-	1	-	-	-	-	-	-
<i>Xerophyllum tenax</i>	13	3	7	10	11	12	14	13	15	14
Misc. herbs	12	-	2	3	2	4	5	5	2	6
Total shrubs	44	10	25	61	56	45	47	49	50	43



Figure 7-3. Shrub cover.

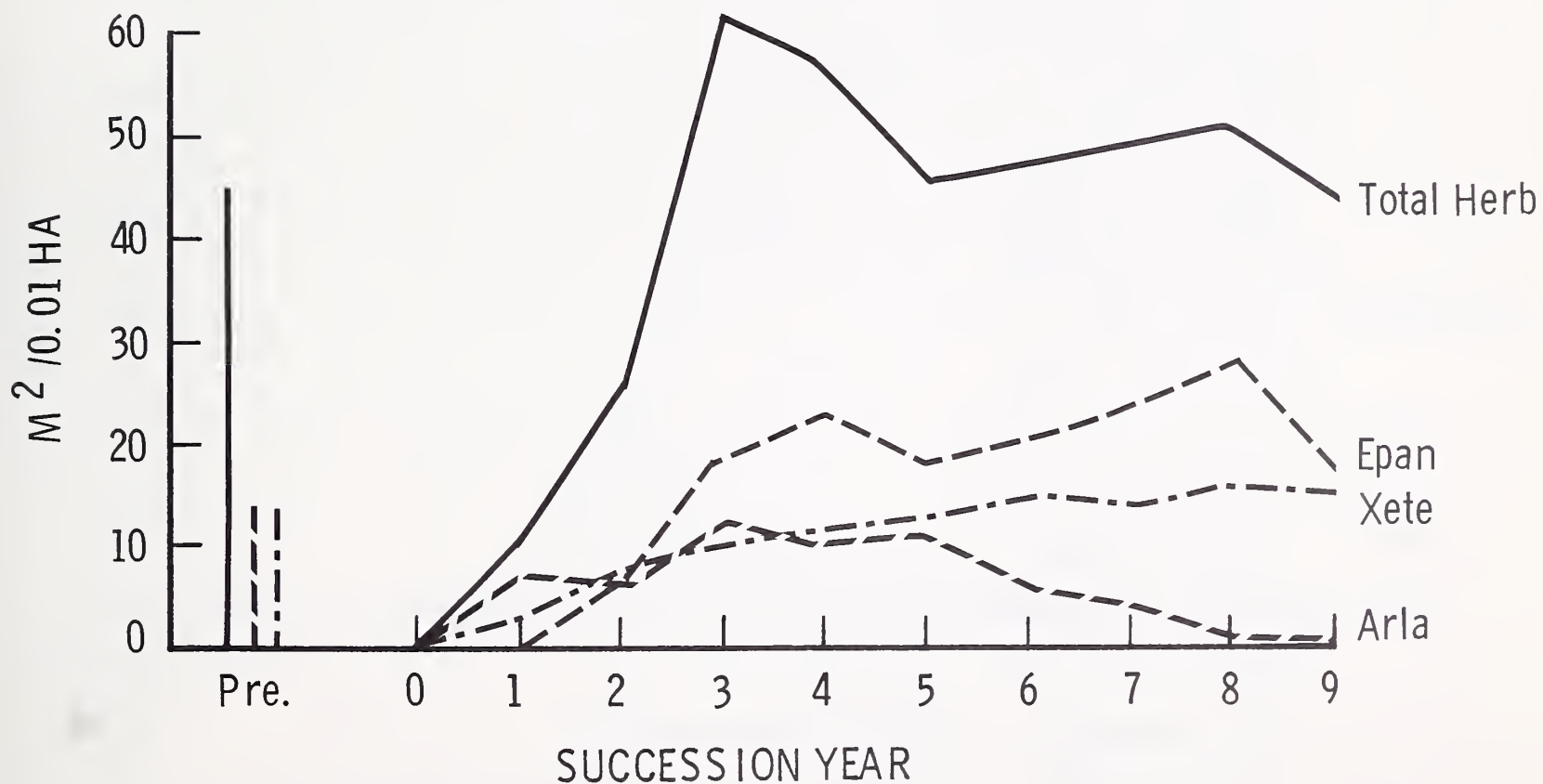


Figure 7-4. Herb cover.

Table 7-5.--Volume development of shrub component ($m^3/0.01$ ha), fig. 7-5.

Species	Succession year										
	Pre	1	2	3	4	5	6	7	8	9	
Pachistima myrsinites	0.1	-	-	-	-	-	-	0.2	0.7	0.5	
Ribes viscosissimum	-	-	-	1.5	1.3	2.5	1.5	2.2	5.5	5.4	
Rosa gymnocarpa	.3	-	0.3	-	-	-	-	-	-	-	
Rubus parviflorus	.1	0.1	1.7	1.5	.7	.3	.3	.5	.9	.5	
Salix scouleriana	-	-	.4	1.3	2.0	5.3	5.9	3.9	9.5	9.2	
Spiraea betulifolia	.4	-	1.1	1.6	.5	1.2	1.8	2.0	2.6	2.3	
Taxus brevifolia	.4	-	-	-	-	-	-	-	-	-	
Vaccinium globulare	12.0	-	-	.2	.2	.5	.4	1.0	2.7	1.6	
Total shrubs	13.3	.1	3.1	6.2	4.6	9.9	9.9	9.8	21.8	19.6	

Table 7-6.--Volume development of herb component ($m^3/0.01$ ha), fig. 7-6.

Species	Succession year									
	Pre	1	2	3	4	5	6	7	8	9
Anaphalis margaritaceae	-	-	-	-	-	-	0.6	0.5	0.4	0.2
Arnica latifolia	1.8	0.3	1.0	2.8	1.4	1.2	.5	.3	-	-
Berberis repens	.1	-	-	-	-	-	-	-	<.1	.1
Carex concinnoides	-	-	-	-	-	-	-	-	.1	.4
Chimaphila umbellata	.2	-	-	-	-	-	-	-	-	-
Cirsium vulgare	-	-	1.4	1.4	-	-	-	.1	.2	<.1
Deschampsia elongata	-	-	-	-	-	-	-	.2	-	-
Epilobium angustifolium	-	-	1.5	8.8	12.5	7.8	10.8	11.3	15.4	9.6
Epilobium paniculatum	-	-	.4	4.7	.5	-	-	-	-	-
Epilobium watsonii	-	-	.3	-	-	-	-	-	-	-
Gnaphalium viscosum	-	-	-	-	-	.2	-	-	-	-
Linnaea borealis	.1	-	-	<.1	.2	<.1	<.1	<.1	<.1	<.1
Viola orbiculata	<.1	-	-	<.1	-	-	-	-	-	-
Xerophyllum tenax	2.1	.3	1.8	2.6	2.5	3.1	3.8	3.0	4.5	4.2
Misc. herbs	1.2	-	.4	.6	.4	.5	.5	.7	.2	1.0
Total herbs	5.6	.6	6.8	21.0	17.6	12.9	16.3	16.2	20.9	15.6

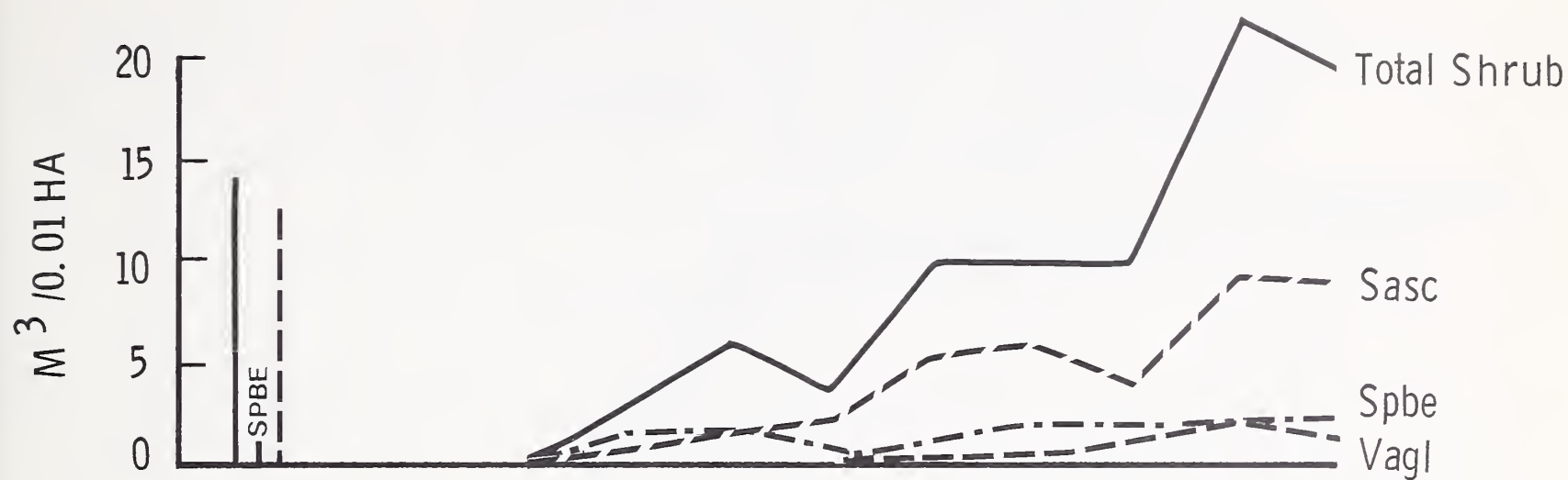


Figure 7-5. Shrub volume.

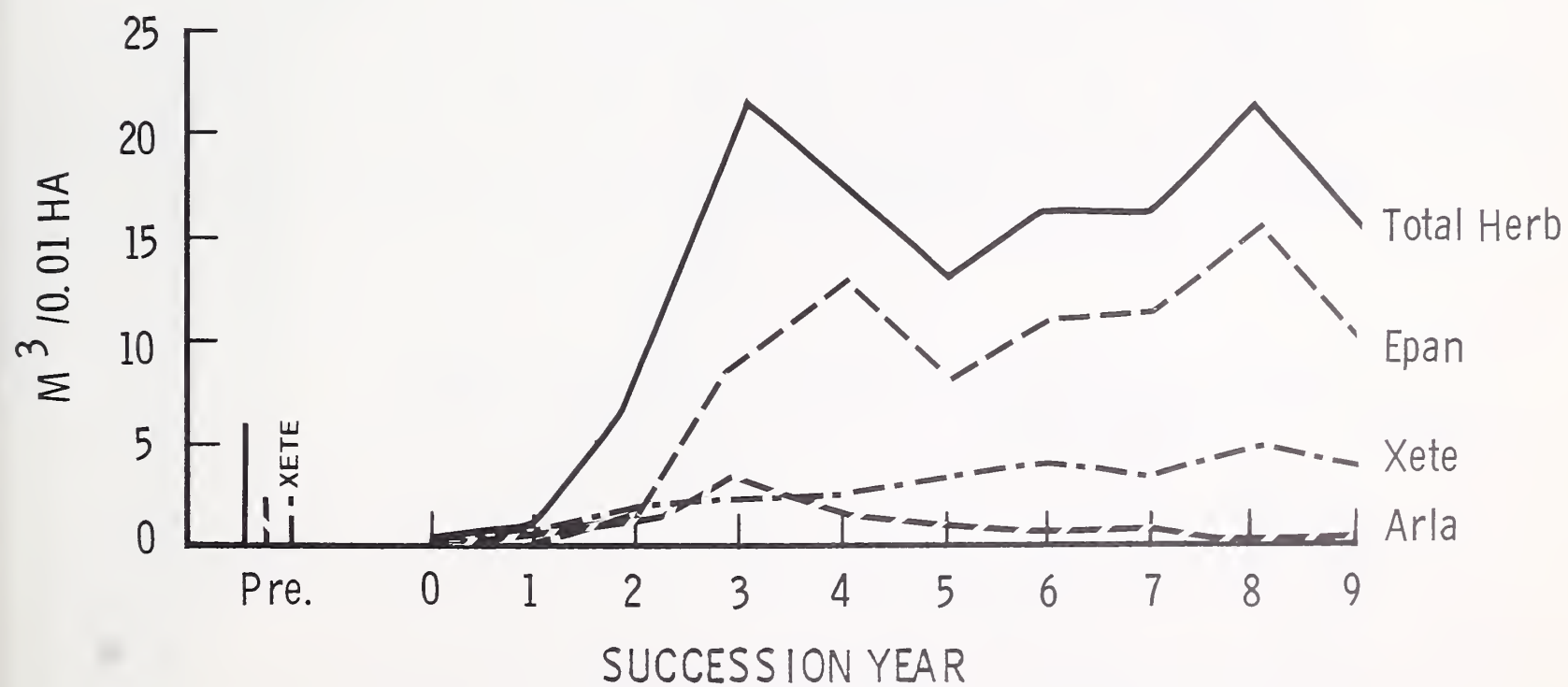


Figure 7-6. Herb volume.

MILLER CREEK: South-2 (1802-13 Area 14-3)

Site location and description: NE $\frac{1}{4}$ SE $\frac{1}{4}$ Sec. 19, T32N R24W MPM.

Elevation: 4,900 ft; Exposure: South (Az. 160°); Slope: 25%

Habitat type: *Abies lasiocarpa*/*Clintonia uniflora*, *Xerophyllum tenax* phase

Predisturbance forest stand: Pien 37%, Psme 31%, Laoc 21%, Abia 9%, Pico 3% (Stand basal area: 5,505 cm²/0.01 ha)

Disturbance treatment: Logged December 1967; Slashed February 1968;

Broadcast-burned: May 18, 1968 (Succession year 1:1968);

Fire intensity: -- g water loss; Duff moisture: Upper 41%,

Lower 135%; Postfire duff depth: -- cm (--% of preburn depth)

Table 8-1.--Successional development of vegetative cover (m²/0.01 ha or %), fig. 8-1.

Life-form component	Succession year										
	Pre	1	2	3	4	5	6	7	8	9	
Tree	-	-	-	-	-	-	-	-	-	-	
Shrub	54	-	6	10	10	8	14	13	20	12	
Herb	35	6	20	46	52	54	49	52	48	59	
Total veg.	89	6	26	56	62	62	63	65	69	71	
Exposed ground surface:											
Bare ground	-	2	-	2	1	1	-	-	2	-	
Rock	-	-	-	-	-	-	-	-	-	-	
Litter	38	92	74	42	37	37	42	33	27	29	
Moss	17	-	-	-	2	2	-	4	7	2	

Table 8-2.--Successional development of vegetative volume (m³/0.01 ha), fig. 8-2.

Life-form component	Succession year										
	Pre	1	2	3	4	5	6	7	8	9	
Tree	-	-	-	-	-	-	-	-	-	-	
Shrub	84.9	-	1.2	2.0	2.5	1.9	5.0	4.2	8.5	5.7	
Herb	4.2	0.8	6.3	16.7	16.2	16.9	14.6	14.4	15.9	15.8	
Total veg.	89.1	.8	7.4	18.6	18.7	18.8	19.6	18.6	24.4	21.5	

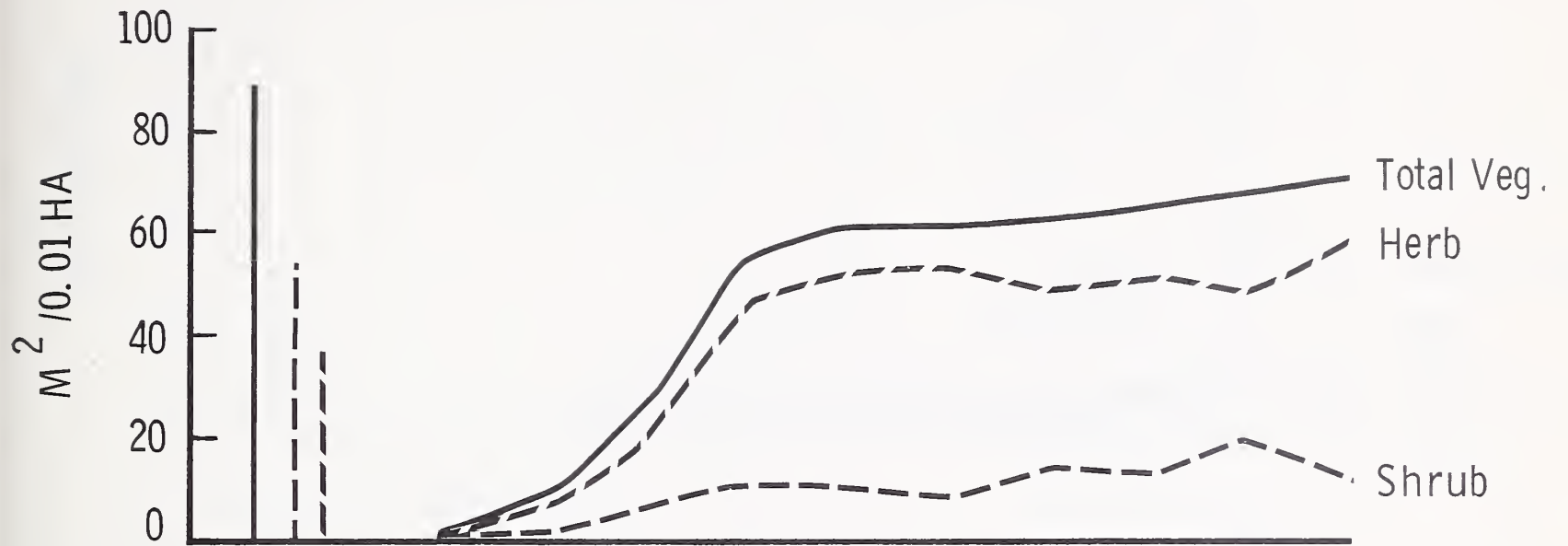


Figure 8-1. Vegetative cover.

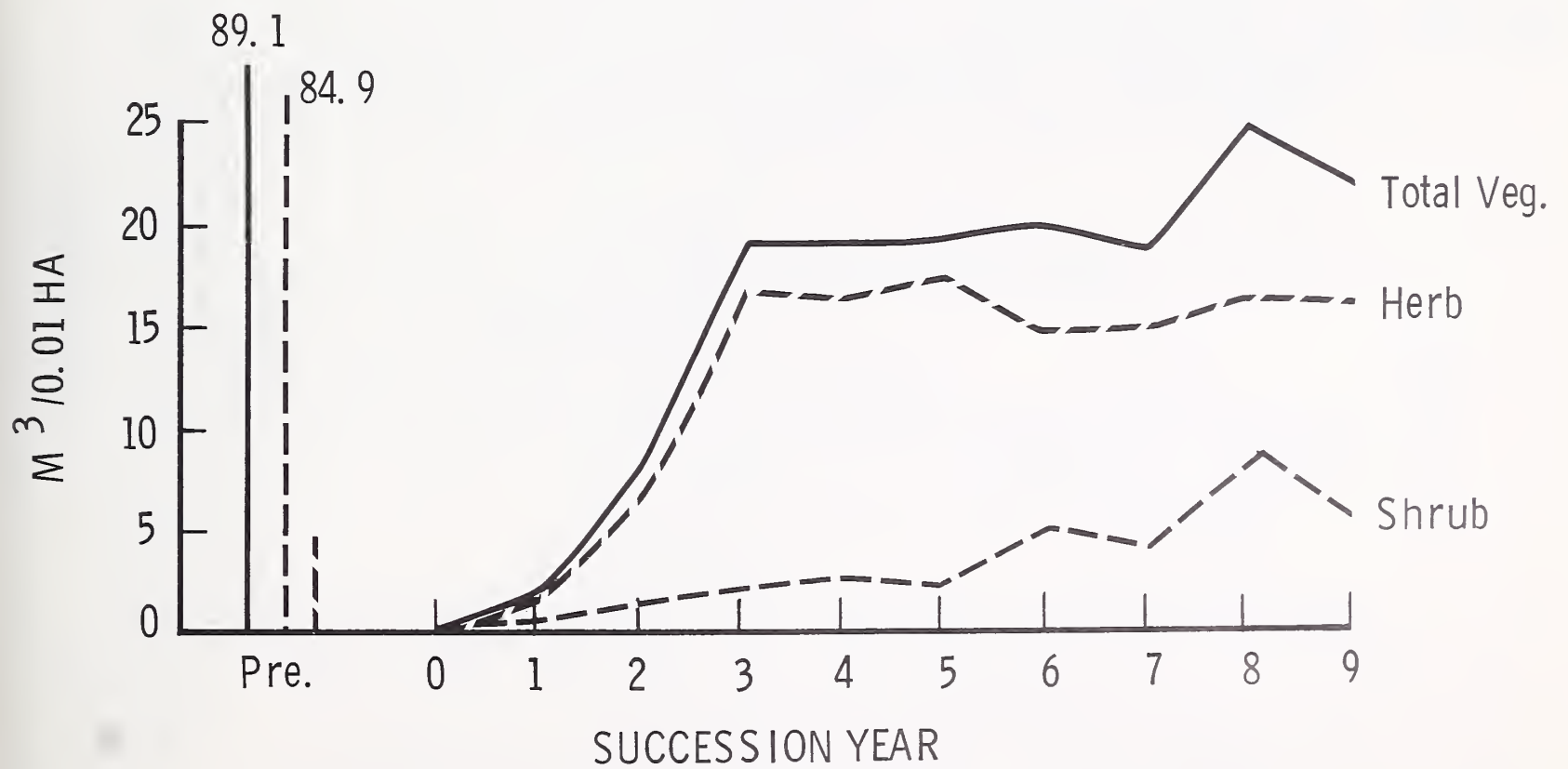


Figure 8-2. Vegetative volume.

MC: S-2 (A-14-3)

Table 8-3.--Cover development of shrub component
(m²/0.01 ha or %), fig. 8-3.

Species	Succession year									
	Pre	1	2	3	4	5	6	7	8	9
<i>Alnus sinuata</i>	-	-	<1	-	-	-	-	-	-	-
<i>Lonicera utahensis</i>	-	-	-	-	-	-	-	-	-	2
<i>Menziesia ferruginea</i>	18	-	-	-	1	1	3	1	2	-
<i>Pachistima myrsinites</i>	1	-	1	2	1	1	1	2	2	1
<i>Ribes lacustre</i>	1	-	-	-	-	-	1	-	-	<1
<i>Ribes viscosissimum</i>	-	-	-	-	-	-	-	-	-	<1
<i>Rosa gymnocarpa</i>	-	-	-	-	-	-	-	-	1	-
<i>Rubus parviflorus</i>	-	-	1	1	2	1	1	3	3	1
<i>Salix scouleriana</i>	-	-	<1	-	-	-	1	<1	2	1
<i>Spiraea betulifolia</i>	2	-	2	5	4	1	4	2	3	2
<i>Taxus brevifolia</i>	22	-	-	-	-	-	-	-	-	-
<i>Vaccinium globulare</i>	11	-	2	2	2	4	3	4	7	5
<i>Vaccinium scoparium</i>	1	-	-	-	-	-	-	-	-	-
Total shrubs	54	-	6	10	10	8	14	13	20	12

Table 8-4.--Cover development of herb component
(m²/0.01 ha or %), fig. 8-4.

Species	Succession year									
	Pre	1	2	3	4	5	6	7	8	9
<i>Carex concinnoides</i>	-	-	-	-	1	1	1	3	2	2
<i>Chimaphila umbellata</i>	2	-	-	-	-	-	-	-	-	-
<i>Cirsium vulgare</i>	-	-	3	-	-	-	-	-	-	-
<i>Epilobium angustifolium</i>	-	-	2	17	17	19	14	22	18	14
<i>Epilobium paniculatum</i>	-	-	-	2	2	-	-	-	-	-
<i>Linnaea borealis</i>	7	-	3	6	10	12	15	10	12	18
<i>Xerophyllum tenax</i>	17	-	11	18	17	20	16	17	13	22
Misc. herbs	9	6	1	2	3	2	3	-	2	2
Total herbs	35	6	20	46	52	54	49	52	48	59



Figure 8-3. Shrub cover.

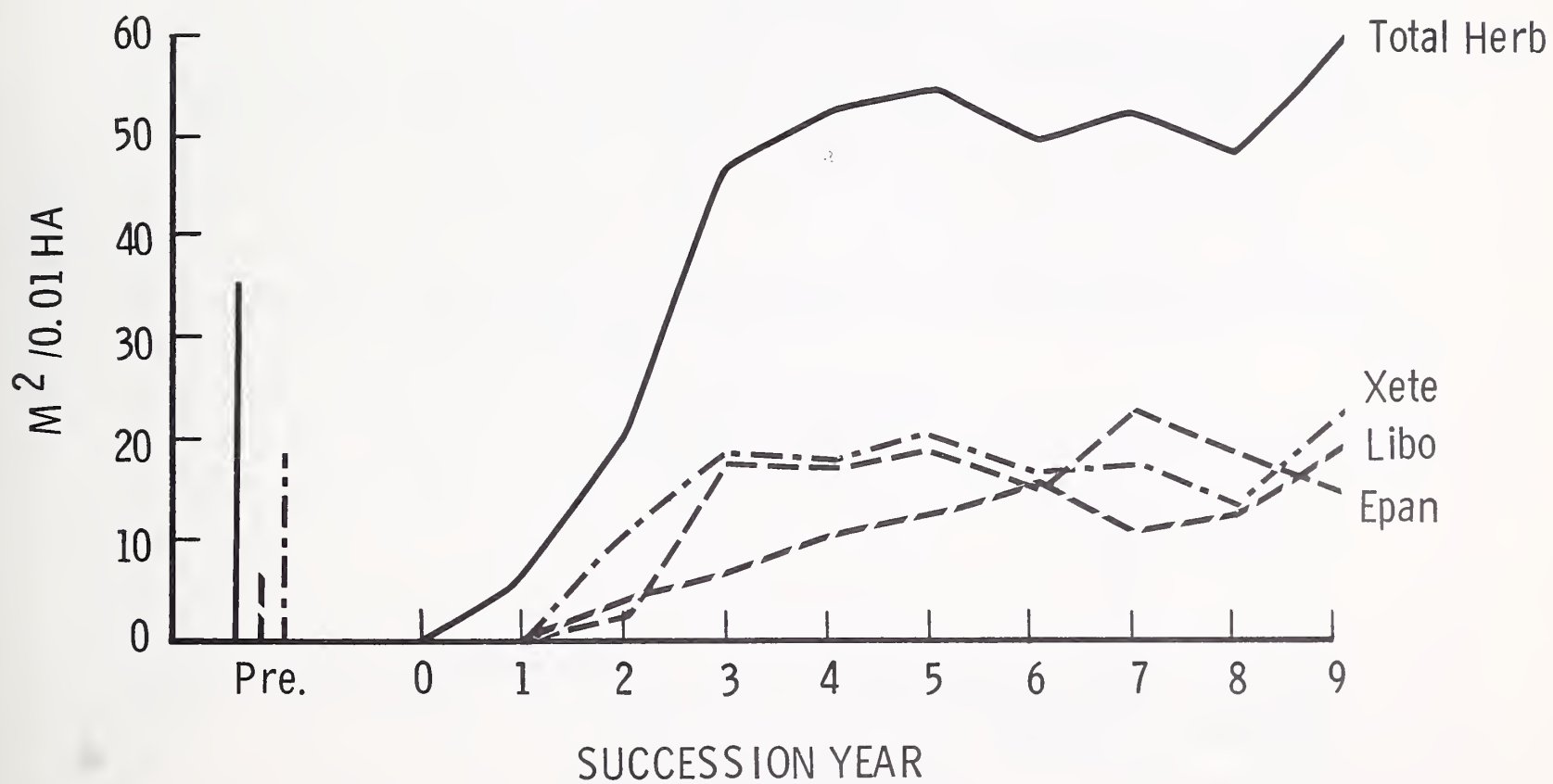


Figure 8-4. Herb cover.

MC: S-2 (A-14-3)

Table 8-5.--Volume development of shrub component (m³/0.01 ha), fig. 8-5.

Species	Succession year									
	Pre	1	2	3	4	5	6	7	8	9
<i>Alnus sinuata</i>	-	-	0.1	-	-	-	-	-	-	-
<i>Lonicera utahensis</i>	-	-	-	-	-	-	-	-	-	1.8
<i>Menziesia ferruginea</i>	28.3	-	-	-	0.4	0.6	2.2	1.1	2.6	-
<i>Pachistima myrsinites</i>	.1	-	.1	0.2	.2	.1	.1	.3	.5	.2
<i>Ribes lacustre</i>	.6	-	-	-	-	-	.5	-	-	.1
<i>Ribes viscosissimum</i>	-	-	-	-	-	-	-	-	-	.2
<i>Rosa gymnocarpa</i>	-	-	-	-	-	-	-	-	.3	-
<i>Rubus parviflorus</i>	-	-	.3	.1	.5	.1	.2	.9	.9	.3
<i>Salix scouleriana</i>	-	-	<.1	-	-	-	.5	.4	1.9	1.4
<i>Spiraea betulifolia</i>	.5	-	.4	1.2	1.2	.2	.9	.6	.9	.8
<i>Taxus brevifolia</i>	51.2	-	-	-	-	-	-	-	-	-
<i>Vaccinium globulare</i>	4.2	-	.2	.4	.2	.8	.5	.8	1.4	1.0
<i>Vaccinium scoparium</i>	<.1	-	-	-	-	-	-	-	-	-
Total shrubs	84.9	-	1.2	2.0	2.5	1.9	5.0	4.2	8.5	5.7

Table 8-6.--Volume development of herb component (m³/0.01 ha), fig. 8-6.

Species	Succession year									
	Pre	1	2	3	4	5	6	7	8	9
<i>Carex concinnoides</i>	-	-	-	-	<0.1	<0.1	0.1	0.3	0.2	0.2
<i>Chimaphila umbellata</i>	0.2	-	-	-	-	-	-	-	-	-
<i>Cirsium vulgare</i>	-	-	2.5	-	-	-	-	-	-	-
<i>Epilobium angustifolium</i>	-	-	.6	9.0	9.4	11.1	9.0	10.4	12.0	8.4
<i>Epilobium paniculatum</i>	-	-	-	1.5	.2	-	-	-	-	-
<i>Linnaea borealis</i>	.3	-	.2	.3	1.2	.6	.8	.5	.6	.9
<i>Xerophyllum tenax</i>	2.8	-	2.9	5.4	4.7	4.7	4.3	3.2	2.8	5.8
Misc. herbs	.9	0.8	.1	.6	.5	.5	.5	-	.3	.5
Total herbs	4.2	.8	6.3	16.7	16.2	16.9	14.6	14.4	15.9	15.8



Figure 8-5. Shrub volume.

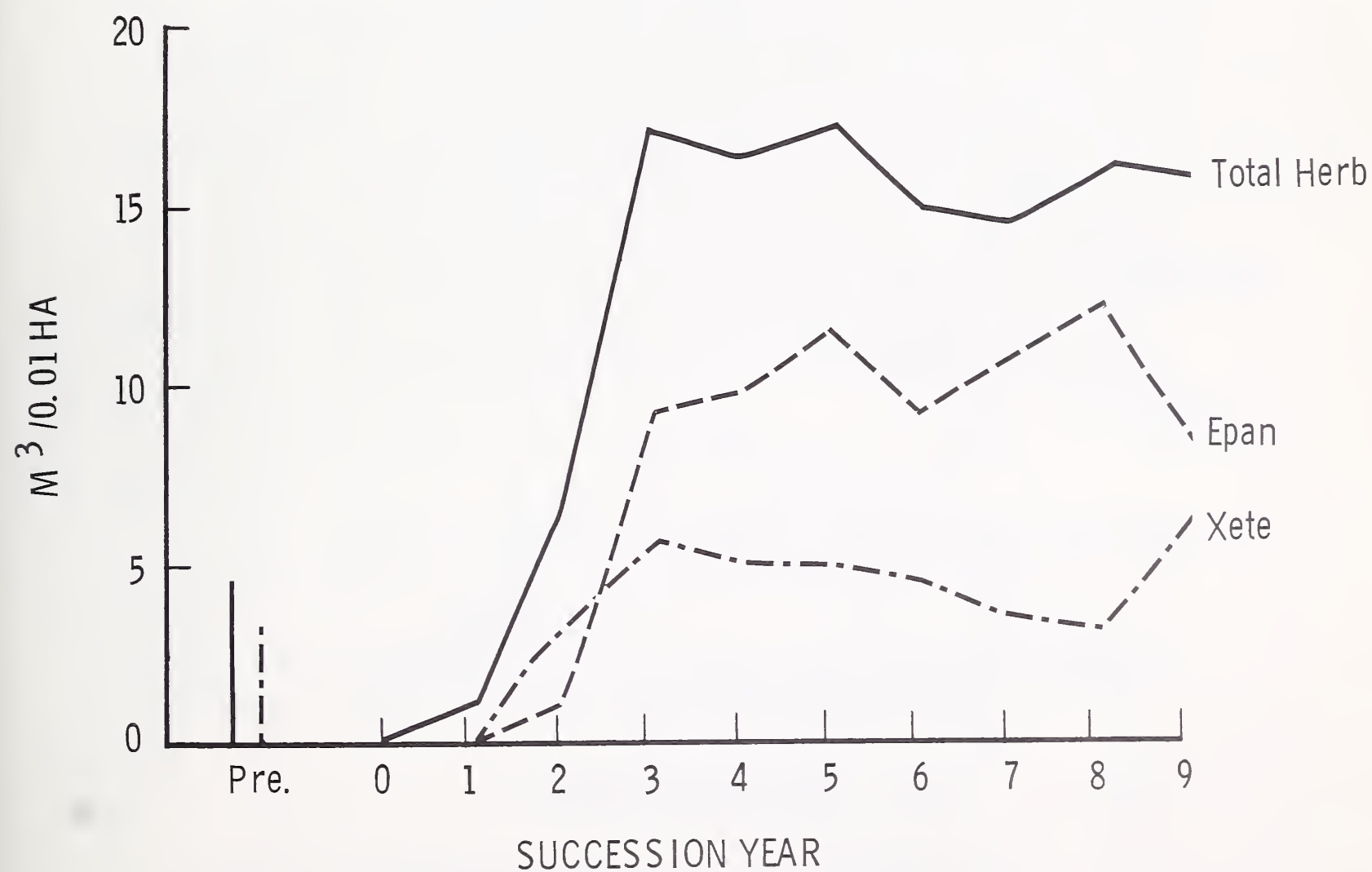


Figure 8-6. Herb volume.

MILLER CREEK: West-3 (1802-13 Area 20)

Site location and description: NE $\frac{1}{4}$ NW $\frac{1}{4}$ Sec. 20, T32N R24W MPM.

Elevation: 4,700 ft; Exposure: West (Az. 255°); Slope: 55%

Habitat type: *Abies lasiocarpa*/*Clintonia uniflora*, *Aralia nudicaulis* Phase

Predisturbance forest stand: *Abla* 34%, *Laoc* 26%, *Pien* 26%, *Psme* 10%, *Pico* 4% (Stand basal area: 2,173 cm²/0.01 ha)

Disturbance treatment: Logged October 1967; Slashed October 1967;

Broadcast-burned: September 30, 1968 (Succession year 1:1969);

Fire intensity: 423 g water loss; Duff moisture: Upper 65%, Lower 179%; Postfire duff depth: 4.5 cm (89% of preburn depth)

Table 9-1.--Successional development of vegetative cover (m²/0.01 ha or %), fig. 9-1.

Life-form component	Succession year									
	Pre	1	2	3	4	5	6	7	8	
Tree	-	-	-	-	-	-	-	-	-	
Shrub	156	7	21	23	24	28	25	46	38	
Herb	22	7	22	27	28	22	22	30	27	
Total veg.	177	14	44	50	52	50	47	76	65	

Exposed ground surface:

Bare ground	-	2	6	2	1	3	1	2	4
Rock	-	1	1	-	-	1	-	-	-
Litter	43	83	56	48	49	53	52	35	34
Moss	12	-	-	4	2	1	1	4	2

Table 9-2.--Successional development of vegetative volume (m³/0.01 ha), fig. 9-2.

Life-form component	Succession year																
	Pre	:	1	:	2	:	3	:	4	:	5	:	6	:	7	:	8
Tree	-		-		-		-		-		-		-		-		-
Shrub	156.3		1.4		7.8		7.1		8.4		9.7		8.7		19.2		14.7
Herb	1.8		.7		10.7		10.8		11.9		8.6		7.1		8.3		8.0
Total veg.	158.1		2.1		18.5		17.8		20.3		20.3		18.3		15.8		22.7

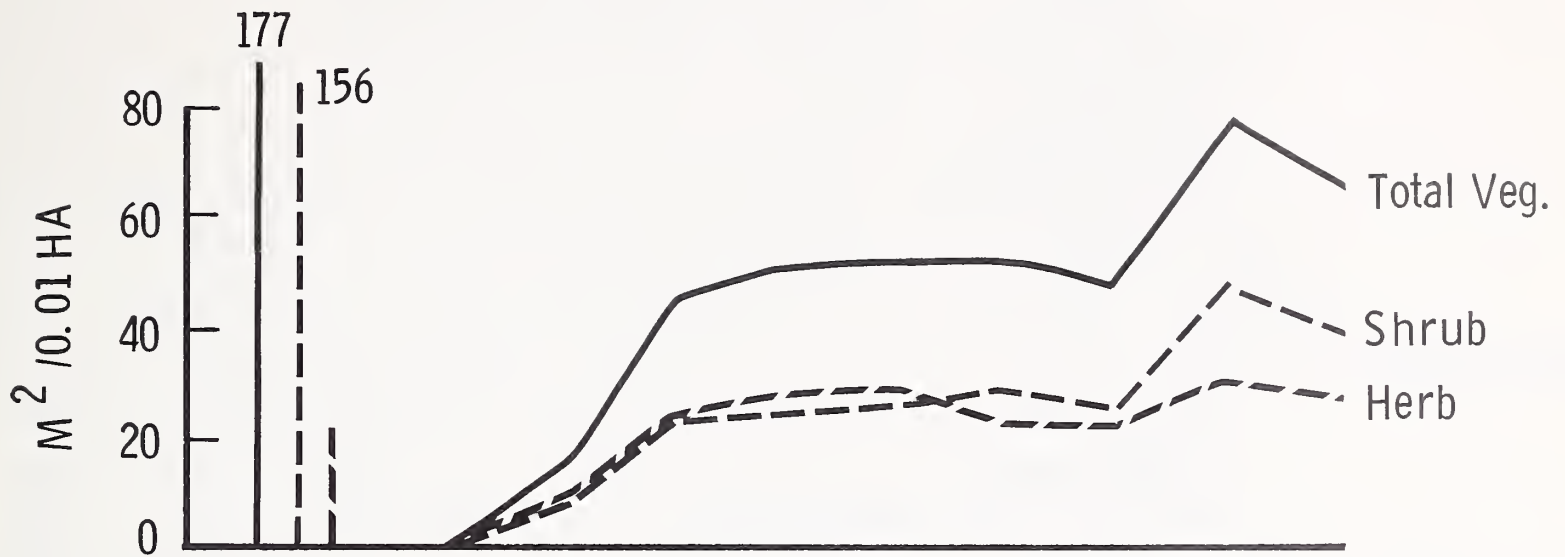


Figure 9-1. Vegetative cover.

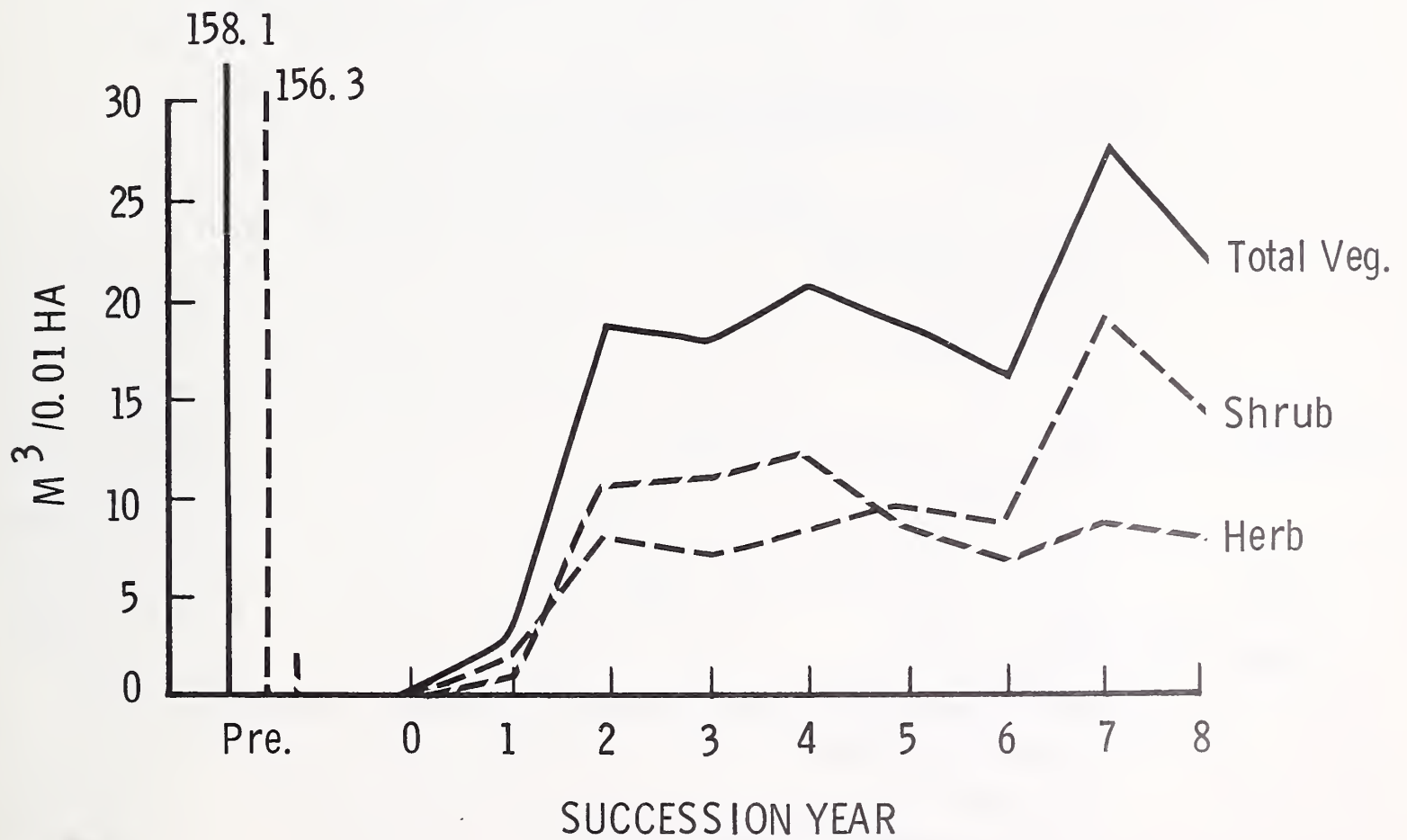


Figure 9-2. Vegetative volume.

Table 9-3.--Cover development of shrub component
(m²/0.01 ha or %), fig. 9-3.

Species		Succession year								
		Pre :	1 :	2 :	3 :	4 :	5 :	6 :	7 :	8
<i>Acer glabrum</i>	11	1	-	-	-	-	-	-	-	<1
<i>Lonicera utahensis</i>	2	-	-	-	-	-	-	-	1	1
<i>Pachistima myrsinites</i>	4	-	-	-	2	2	2	7	5	
<i>Ribes lacustre</i>	-	-	-	-	-	-	-	-	-	1
<i>Ribes viscosissimum</i>	-	-	1	<1	<1	2	2	2	2	
<i>Rosa gymnocarpa</i>	-	-	4	1	-	<1	<1	2	2	
<i>Rubus parviflorus</i>	<1	4	9	9	10	11	5	12	11	
<i>Sambucus racemosa</i>	-	-	1	<1	-	-	1	1	<1	
<i>Spiraea betulifolia</i>	3	2	6	7	7	8	9	16	12	
<i>Taxus brevifolia</i>	105	-	-	-	-	-	-	-	-	
<i>Vaccinium globulare</i>	31	-	-	5	4	5	6	7	5	
Total shrubs	156	7	21	23	24	28	25	46	38	

Table 9-4.--Cover development of herb component
(m²/0.01 ha or %), fig. 9-4.

Species		Succession year								
		Pre :	1 :	2 :	3 :	4 :	5 :	6 :	7 :	8
<i>Anaphalis margaritaceae</i>	-	-	1	1	2	1	2	2	2	2
<i>Arnica latifolia</i>	1	1	2	2	1	-	-	2	1	
<i>Carex concinnoides</i>	-	-	-	-	2	2	2	6	7	
<i>Carex rossii</i>	-	-	1	1	2	2	2	2	3	
<i>Chimaphila umbellata</i>	1	-	-	-	-	-	-	-	-	
<i>Cirsium vulgare</i>	-	-	-	-	-	-	2	-	-	
<i>Epilobium angustifolium</i>	-	-	10	15	12	8	5	9	7	
<i>Epilobium paniculatum</i>	-	-	1	-	-	-	-	-	-	
<i>Geranium bicknellii</i>	-	3	-	-	-	-	-	-	-	
<i>Goodyera oblongifolia</i>	1	-	-	-	-	-	-	-	-	
<i>Gymnocarpium dryopteris</i>	1	-	-	-	-	-	-	-	-	
<i>Linnaea borealis</i>	8	-	-	-	-	-	1	1	2	
<i>Thalictrum occidentale</i>	1	-	1	2	2	1	1	2	1	
<i>Tiarella trifoliata</i>	1	-	-	-	-	-	-	-	-	
<i>Xerophyllum tenax</i>	4	-	-	2	1	1	1	1	2	
Misc. herbs	5	2	8	5	8	8	7	6	3	
Total herbs	22	7	22	27	28	22	22	30	27	

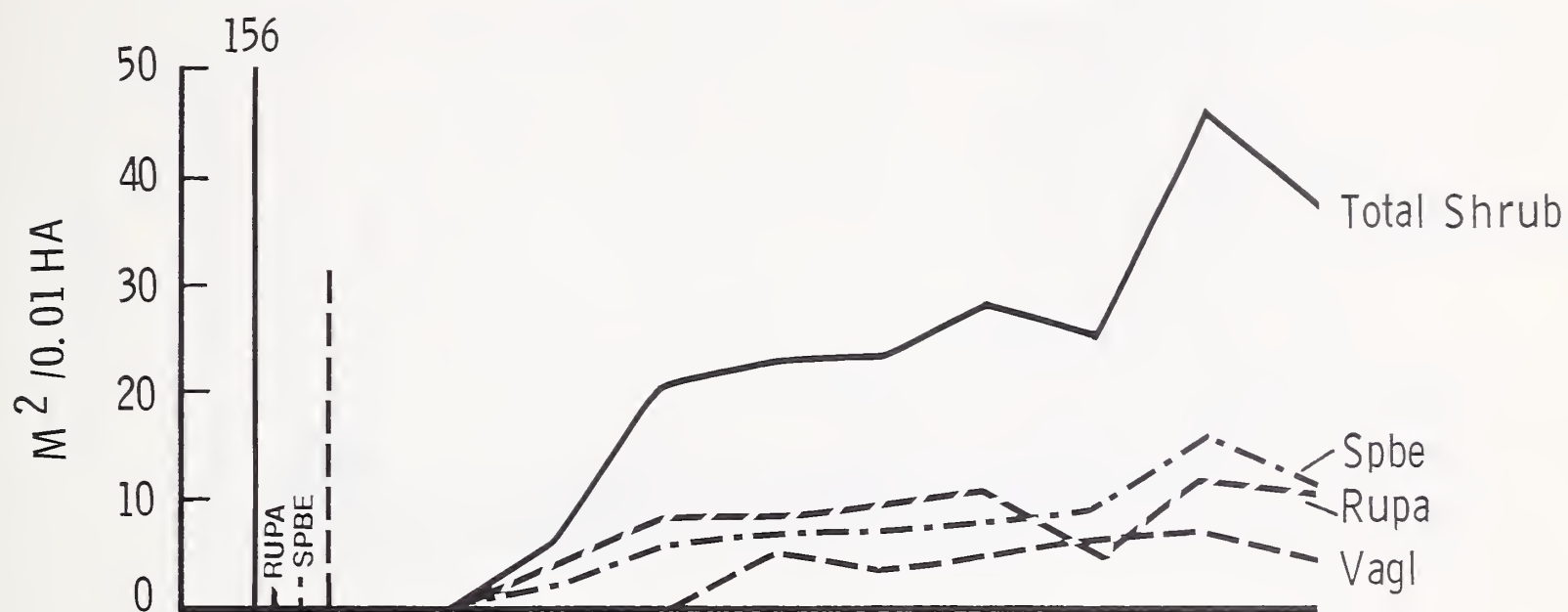


Figure 9-3. Shrub cover.

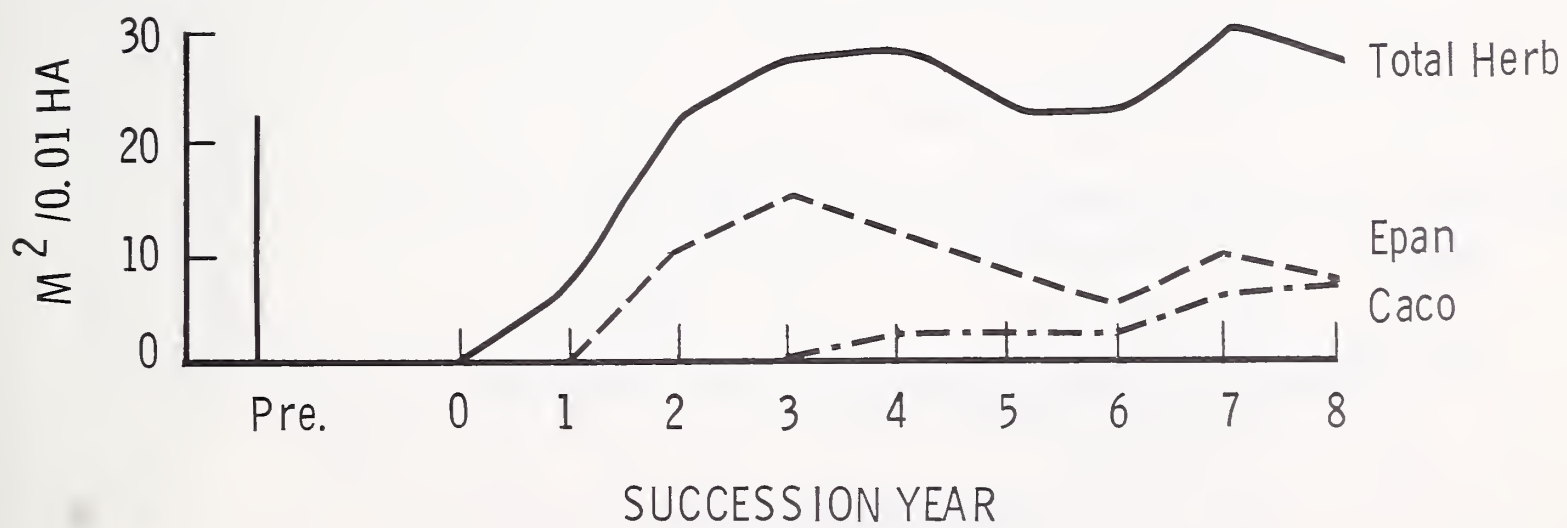


Figure 9-4. Herb cover.

Table 9-5.--Volume development of shrub component ($m^3/0.01$ ha), fig. 9-5.

Species	Succession year									
	Pre	1	2	3	4	5	6	7	8	
Acer glabrum	22.2	0.3	-	-	-	-	-	-	0.5	
Lonicera utahensis	1.3	-	-	-	-	-	-	0.3	.3	
Pachistima myrsinites	.7	-	-	-	0.2	0.3	0.6	1.6	1.6	
Ribes lacustre	-	-	-	-	-	-	-	-	.7	
Ribes viscosissimum	-	-	0.2	0.1	.2	.9	.9	1.5	1.1	
Rosa gymnocarpa	-	-	1.2	.5	-	.2	<.1	1.2	.9	
Rubus parviflorus	.2	.6	3.6	2.5	3.6	3.5	1.6	4.8	3.4	
Sambucus racemosa	-	-	.4	.2	-	-	.6	.7	.2	
Spiraea betulifolia	.9	.5	2.3	2.9	3.4	3.7	3.3	6.6	4.4	
Taxus brevifolia	116.0	-	-	-	-	-	-	-	-	
Vaccinium globulare	15.0	-	-	1.0	.9	1.2	1.6	2.4	1.5	
Total shrubs	156.3	1.4	7.8	7.1	8.4	9.7	8.7	19.2	14.7	

Table 9-6.--Volume development of herb component ($m^3/0.01$ ha), fig. 9-6.

Species	Succession year									
	Pre	1	2	3	4	5	6	7	8	
Anaphalis margaritaceae	-	-	0.3	0.2	0.8	0.2	0.6	0.3	0.4	
Arnica latifolia	0.1	0.1	.2	.2	.1	-	-	.2	.1	
Carex concinnoides	-	-	-	-	.1	.2	.3	.6	.8	
Carex rossii	-	-	.1	.1	.2	.4	.3	.4	.5	
Chimaphila umbellata	<.1	-	-	-	-	-	-	-	-	
Cirsium vulgare	-	-	-	-	-	-	.4	-	-	
Epilobium angustifolium	-	-	7.9	8.4	8.3	5.8	3.2	4.9	4.8	
Epilobium paniculatum	-	-	.3	-	-	-	-	-	-	
Geranium bicknellii	-	.2	-	-	-	-	-	-	-	
Goodyera oblongifolia	<.1	-	-	-	-	-	-	-	-	
Gymnocarpium dryopteris	.1	-	-	-	-	-	-	-	-	
Linnaea borealis	.4	-	-	-	-	-	<.1	<.1	.1	
Thalictrum occidentale	.1	-	.4	.6	.7	.2	.3	.5	.2	
Tiarella trifoliata	<.1	-	-	-	-	-	-	-	-	
Xerophyllum tenax	.7	-	-	.6	.3	.3	.3	.2	.7	
Misc. herbs	.4	.3	1.6	.7	1.2	1.4	1.6	1.0	.4	
Total herbs	1.8	.7	10.7	10.8	11.9	8.6	7.1	8.3	8.0	



Figure 9-5. Shrub volume.

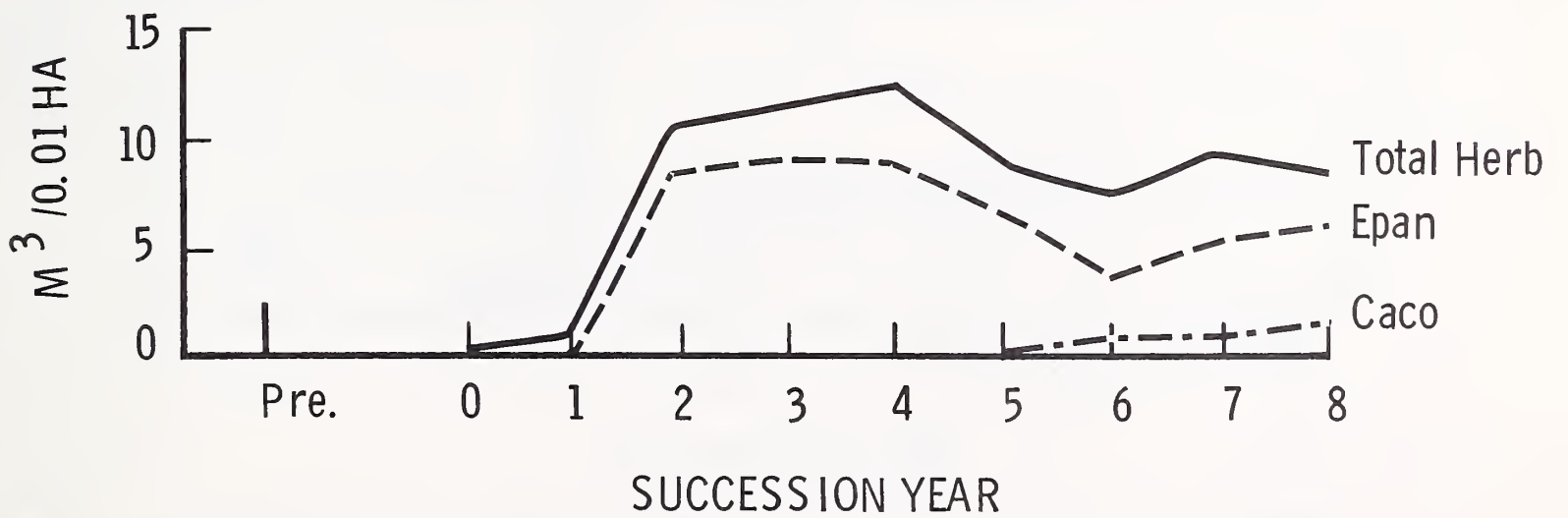


Figure 9-6. Herb volume.

MILLER CREEK: West-10 (1802-13 Area 17-1)

Site location and description: NE $\frac{1}{4}$ SW $\frac{1}{4}$ Sec. 8, T32N R24W MPM.

Elevation: 4,700 ft; Exposure: West (Az. 260°); Slope: 30%

Habitat type: *Abies lasiocarpa*/*Clintonia uniflora*, *Xerophyllum tenax* Phase

Predisturbance forest stand: Laoc 50%, Pien 37%, Abla 10%, Psme 2%
(Stand basal area: 3,023 cm²/0.01 ha)

Disturbance treatment: Logged September 1967; Slashed October 1967;

Broadcast-burned: July 16, 1968 (Succession year 1:1969)

Fire intensity: 519 g water loss; Duff moisture: Upper 41%,
Lower 78%; Postfire duff depth: 2.4 cm (48% of preburn depth)

Table 10-1.--Successional development of vegetative cover
(m²/0.01 ha or %), fig. 10-1.

Life-form component	Succession year									
	Pre	: 1	: 2	: 3	: 4	: 5	: 6	: 7	: 8	
Tree	1	-	-	-	-	-	-	-	1	
Shrub	20	3	12	13	15	19	24	27	28	
Herb	43	7	57	62	35	33	36	45	40	
Total veg.	64	10	69	75	50	52	60	72	69	
Exposed ground surface:										
Bare ground	-	8	2	-	1	1	-	2	-	
Rock	-	7	-	-	-	-	-	-	-	
Litter	42	75	31	23	44	43	37	23	28	
Moss	2	1	-	2	8	8	8	9	9	

Table 10-2.--Successional development of vegetative volume
(m³/0.01 ha), fig. 10-2.

Life-form component	Succession year									
	Pre	1	2	3	4	5	6	7	8	
Tree	0.4	-	-	-	-	-	-	-	1.1	
Shrub	12.4	0.7	3.8	3.9	4.8	5.8	7.6	10.6	11.8	
Herb	5.2	.9	20.4	16.4	12.1	9.8	9.0	13.2	10.2	
Total veg.	18.1	1.8	24.2	20.3	16.8	15.6	16.6	23.9	23.0	

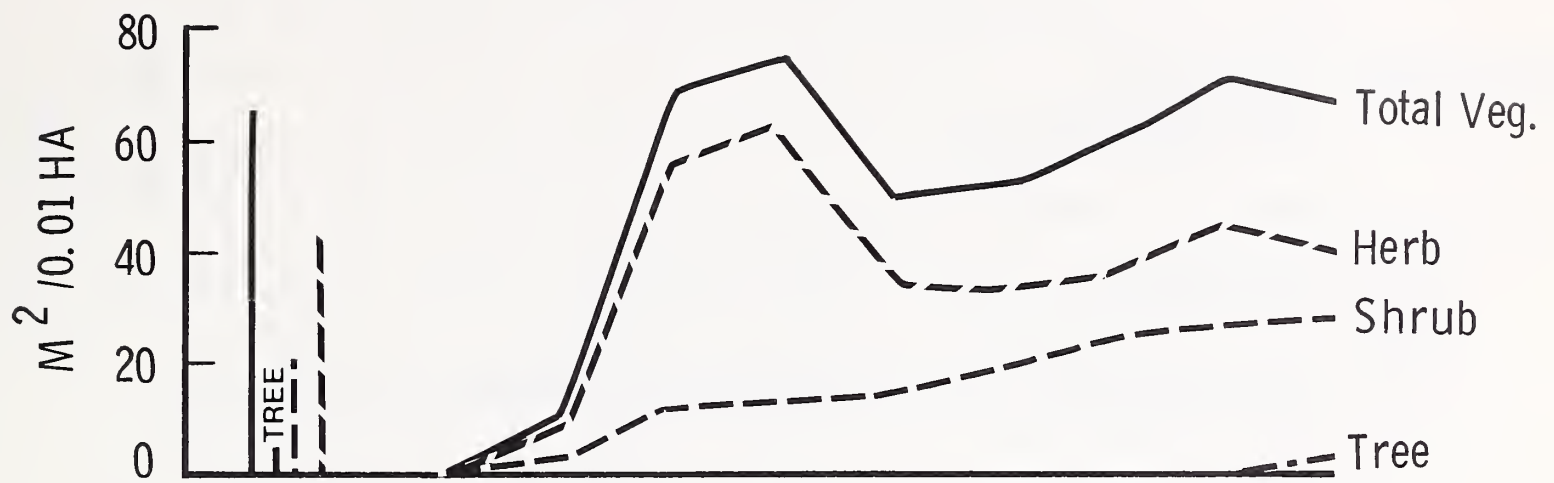


Figure 10-1. Vegetative cover.

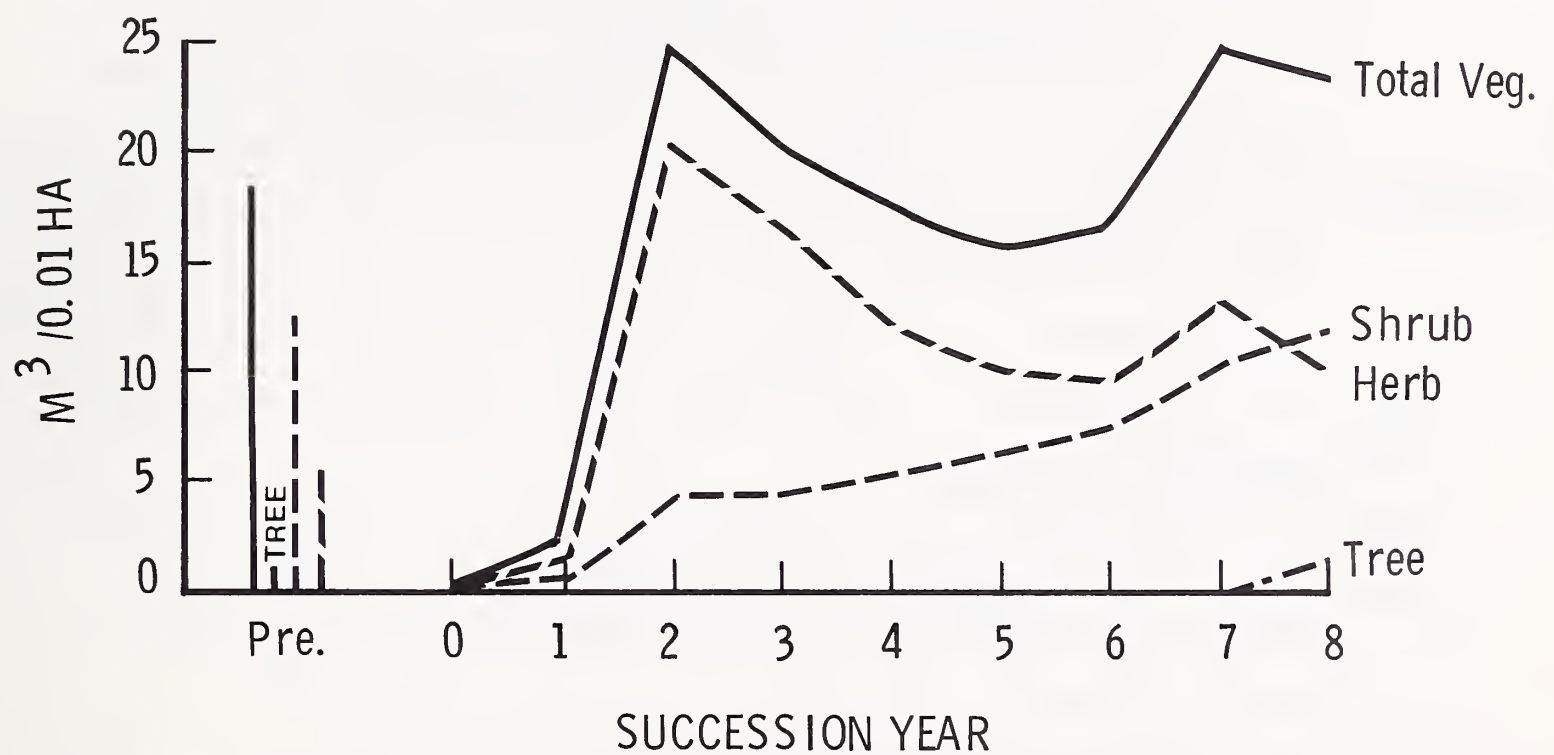


Figure 10-2. Vegetative volume.

MC: W-10 (A-17-1)

Table 10-3.--Cover development of shrub component
(m²/0.01 ha or %), fig. 10-3.

Species	Succession year									
	Pre	1	2	3	4	5	6	7	8	
Acer glabrum	3	-	-	-	-	-	<1	1	1	
Amelanchier alnifolia	-	<1	-	-	-	-	-	-	-	
Lonicera utahensis	3	-	-	-	2	2	2	3	3	
Pachistima myrsinites	10	-	-	2	2	3	7	9	8	
Rubus parviflorus	-	-	4	-	-	-	2	2	2	
Salix scouleriana	-	-	-	-	-	-	<1	1	1	
Spiraea betulifolia	<1	2	7	10	10	9	10	10	10	
Vaccinium globulare	4	-	1	2	2	4	2	2	4	
Total shrubs	20	3	12	13	15	19	24	27	28	

Table 10-4.--Cover development of herb component
(m²/0.01 ha or %), fig. 10-4.

Species	Succession year									
	Pre	1	2	3	4	5	6	7	8	
Arnica latifolia	11	3	8	8	2	1	-	-	1	
Berberis repens	1	-	2	2	2	2	1	2	1	
Carex concinnoides	1	-	1	1	2	4	8	9	14	
Chimaphila umbellata	2	-	-	-	-	-	-	-	-	
Epilobium angustifolium	-	1	17	25	15	10	12	15	9	
Epilobium paniculatum	-	-	18	16	-	-	-	-	-	
Linnaea borealis	8	-	-	-	-	-	-	-	-	
Viola orbiculata	2	-	1	1	-	-	-	-	-	
Xerophyllum tenax	8	2	6	8	9	13	12	12	14	
Misc. herbs	12	1	3	2	5	3	3	6	1	
Total herbs	43	7	57	62	35	33	36	45	40	

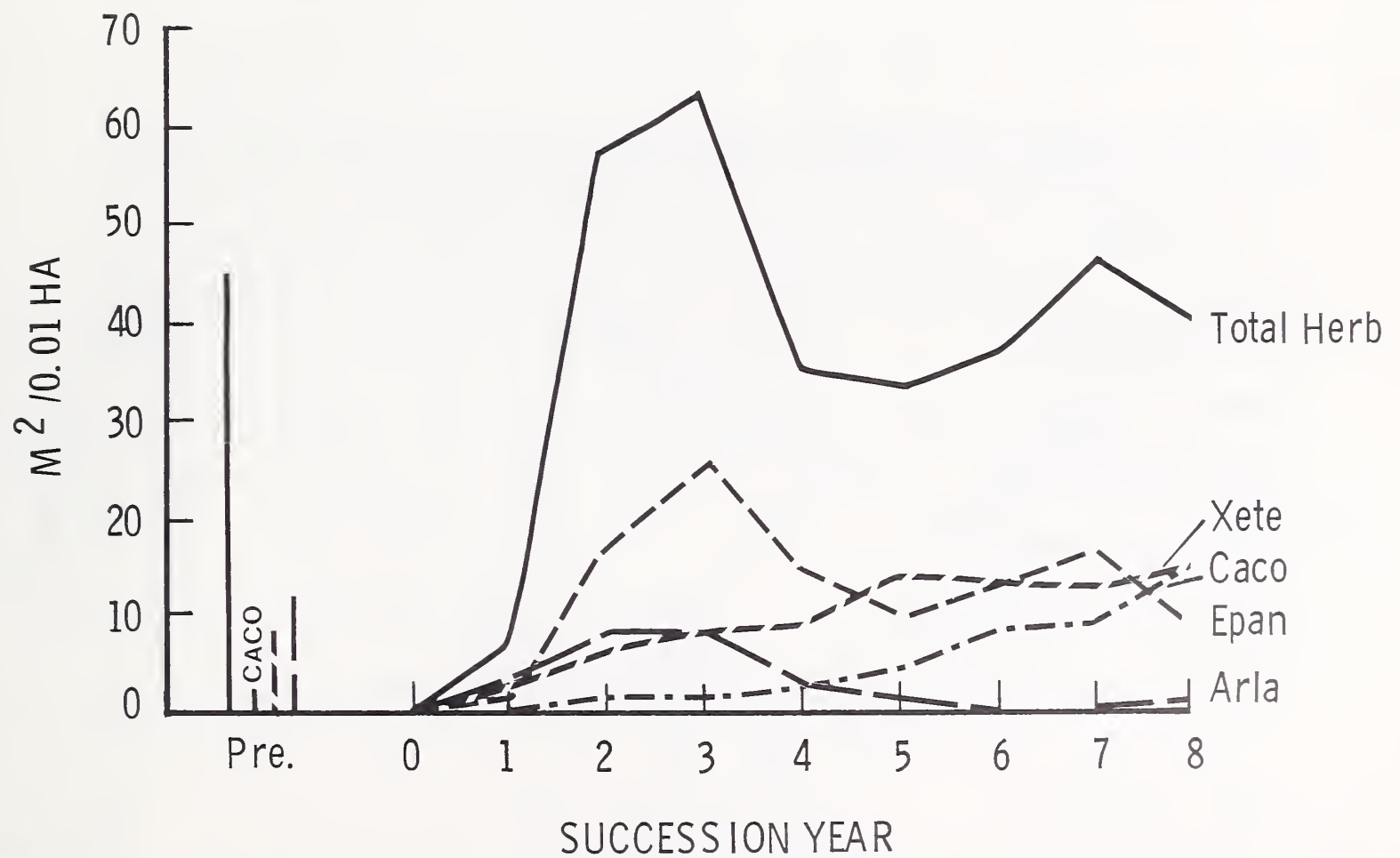


Table 10-5.--Volume development of shrub component ($m^3/0.01$ ha), fig. 10-5.

Species	Successsion year									
	Pre :	1 :	2 :	3 :	4 :	5 :	6 :	7 :	8	
Acer glabrum	6.3	-	-	-	-	-	0.6	1.1	1.2	
Amelanchier alnifolia	-	0.1	-	-	-	-	-	-	-	
Lonicera utahensis	2.0	-	-	-	1.0	1.2	1.1	1.5	1.7	
Pachistima myrsinites	2.3	-	-	0.2	.3	.6	1.4	3.1	2.1	
Rubus parviflorus	-	-	1.2	-	-	-	.4	.4	.7	
Salix scouleriana	-	-	-	-	-	-	.3	.9	1.7	
Spiraea betulifolia	.1	.6	2.4	3.3	3.1	3.0	3.1	3.1	3.5	
Vaccinium globulare	1.7	-	.2	.3	.4	1.0	.7	.5	.8	
Total shrubs	12.4	.7	3.8	3.9	4.8	5.8	7.6	10.6	11.8	

Table 10-6.--Volume development of herb component ($m^3/0.01$ ha), fig. 10-6.

Species	Succession year									
	Pre :	1 :	2 :	3 :	4 :	5 :	6 :	7 :	8	
Arnica latifolia	1.2	0.4	3.7	1.5	0.2	<0.1	-	-	0.1	
Berberis repens	.1	-	.2	.2	.2	.1	0.1	0.2	.1	
Carex concinnoides	<.1	-	.1	.1	.2	.4	.8	.9	1.4	
Chimaphila umbellata	.2	-	-	-	-	-	-	-	-	
Epilobium angustifolium	-	.1	6.9	11.4	8.9	5.6	5.3	8.0	4.8	
Epilobium paniculatum	-	-	7.5	1.1	-	-	-	-	-	
Linnaea borealis	.4	-	-	-	-	-	-	-	-	
Viola orbiculata	.1	-	<.1	<.1	-	-	-	-	-	
Xerophyllum tenax	2.2	.4	1.2	1.6	1.8	2.9	2.4	3.3	3.7	
Misc. herbs	1.0	.1	.8	.4	.8	.8	.4	.7	.2	
Total herbs	5.2	.9	20.4	16.4	12.1	9.8	9.0	13.2	10.2	

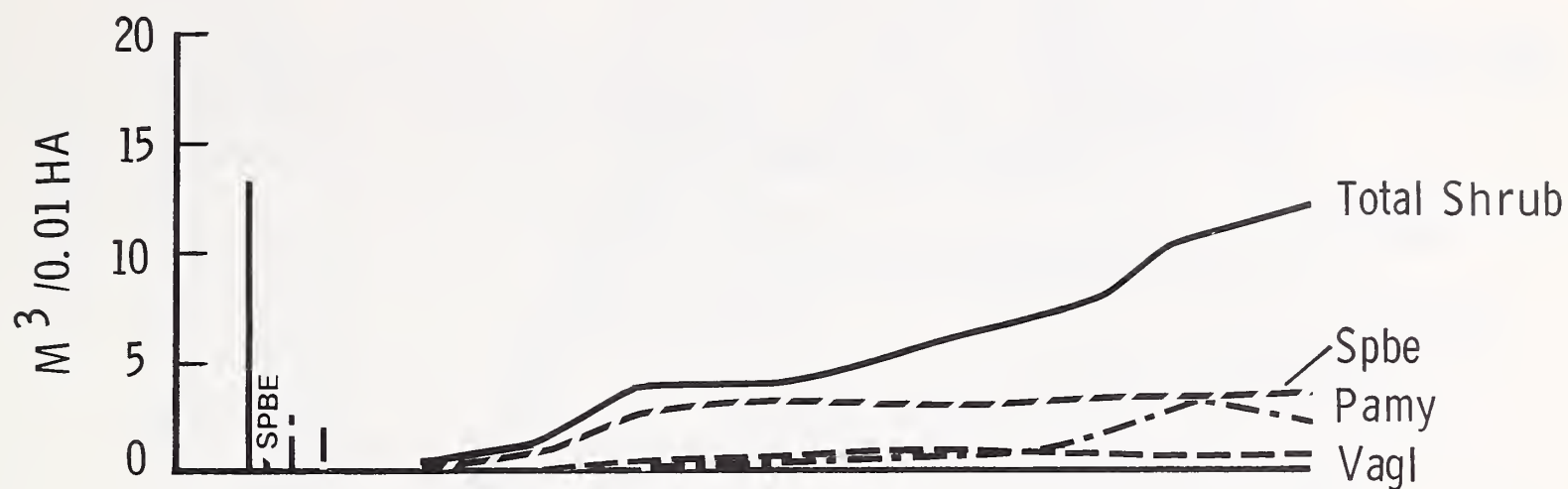


Figure 10-5. Shrub volume.

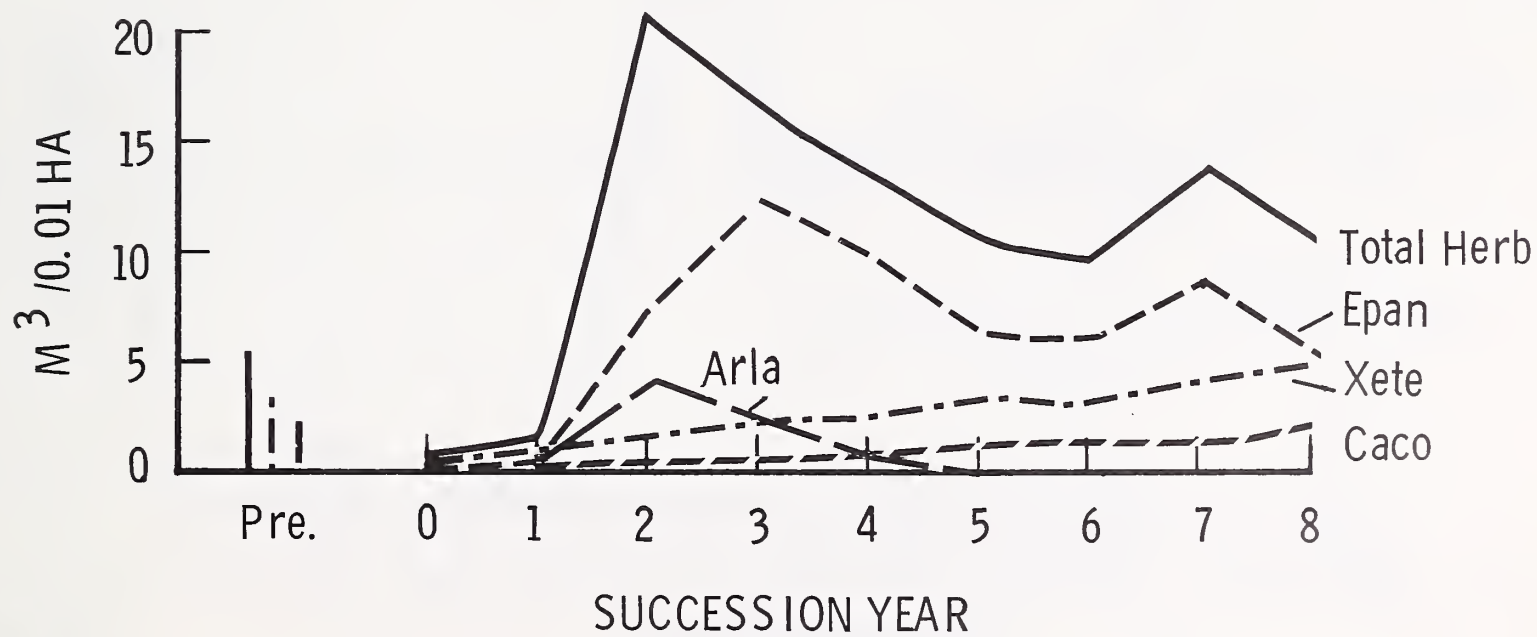


Figure 10-6. Herb volume.

MILLER CREEK: West-15 (1802-13 Area 17-3)

Site location and description: NE $\frac{1}{4}$ SW $\frac{1}{4}$ Sec. 8, T32N R24W MPM.

Elevation: 4,600 ft; Exposure: West (Az. 270 $\frac{1}{4}$); Slope: 25%

Habitat type: *Abies lasiocarpa*/*Clintonia uniflora*, *Xerophyllum*
tenax Phase

Predisturbance forest stand: Laoc 70%, Pien 16%, Abia 14%, Psme <1%

Stand basal area: 3,771 cm²/0.01 ha)

Disturbance treatment: Logged January 1968; Slashed February 1968;

Broadcast-burned: October 2, 1968 (Succession year 1:1969)

Fire intensity: 228 g water loss; Duff moisture: Upper 164%,
Lower 212%; Postfire duff depth: 6.4 cm (89% of preburn depth)

Table 11-1.--Successional development of vegetative cover
(m²/0.01 ha or %), fig. 11-1.

Life-form component	Succession year								
	Pre	1	2	3	4	5	6	7	8
Tree	2	-	-	-	-	-	-	-	-
Shrub	56	1	10	17	16	19	26	32	34
Herb	66	39	67	46	47	42	45	46	51
Total veg.	124	40	76	62	63	61	71	79	84
Exposed ground surface:									
Bare ground	-	-	-	-	-	-	-	-	-
Rock	-	-	-	-	-	-	-	-	-
Litter	11	60	27	43	45	47	37	30	30
Moss	1	-	-	-	-	-	-	6	-

Table 11-2.--Successional development of vegetative volume
(m³/0.01 ha), fig. 11-2.

Life-form component	Succession year								
	Pre	1	2	3	4	5	6	7	8
Tree	0.8	-	-	-	-	-	-	-	-
Shrub	97.3	0.4	3.5	6.0	9.7	8.7	12.2	18.3	18.4
Herb	10.6	3.9	26.4	7.4	8.8	6.7	7.6	9.6	8.3
Total veg.	108.6	4.3	29.9	13.4	18.5	15.4	19.7	27.9	26.7

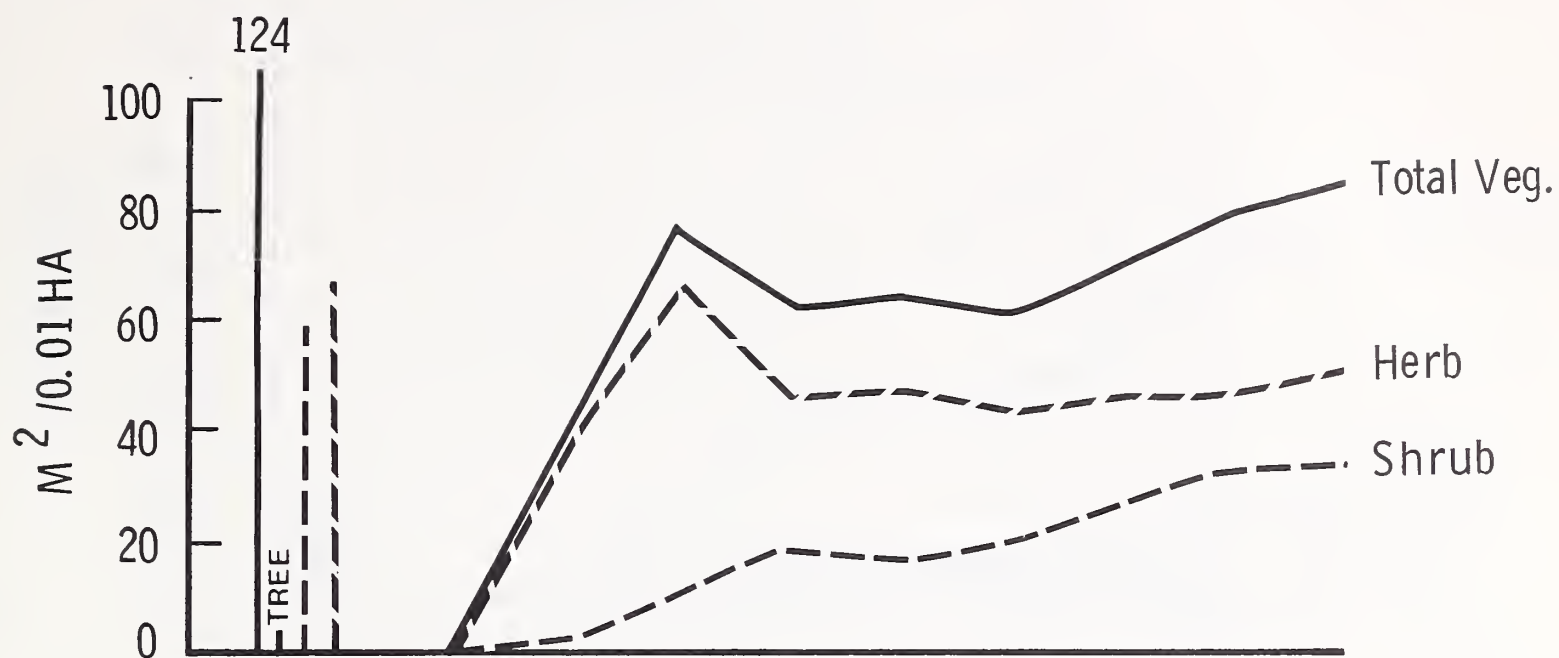


Figure 11-1. Vegetative cover.

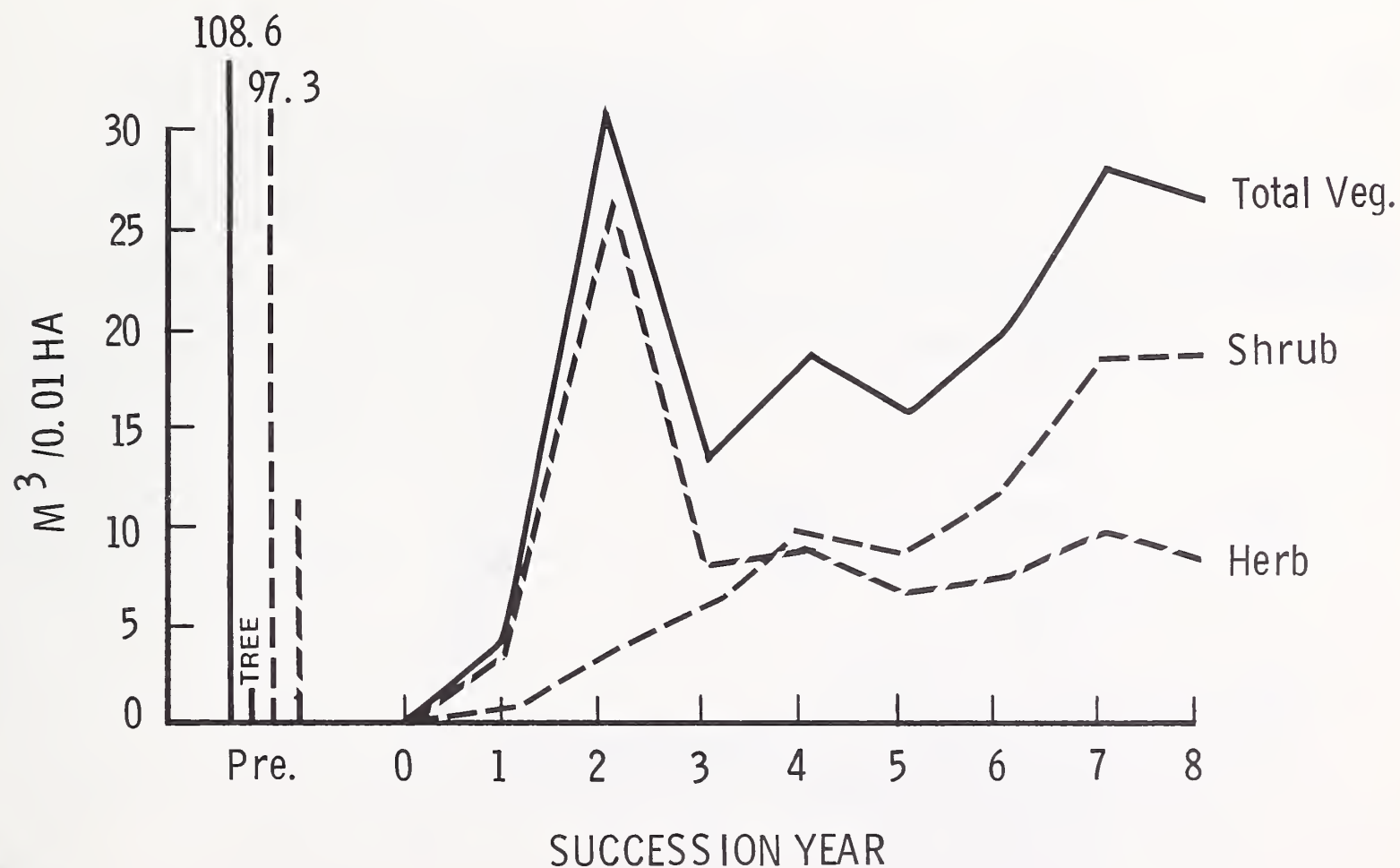


Figure 11-2. Vegetative volume.

MC: W-15 (A-17-3)

Table 11-3.--Cover development of shrub component
(m²/0.01 ha or %), fig. 11-3.

Species	Succession year									
	Pre	1	2	3	4	5	6	7	8	
Acer glabrum	18	-	1	1	4	2	3	4	2	
Lonicera utahensis	2	-	1	2	3	5	5	7	8	
Pachistima myrsinites	11	-	-	-	1	2	5	7	8	
Rosa gymnocarpa	2	<1	4	7	4	4	5	8	3	
Rubus parviflorus	1	1	2	1	2	2	3	2	2	
Salix scouleriana	-	-	-	-	-	-	<1	<1	2	
Spiraea betulifolia	1	-	1	3	2	3	2	1	5	
Symphoricarpos albus	-	-	-	-	-	-	-	-	<1	
Taxus brevifolia	8	-	-	-	-	-	-	-	-	
Vaccinium globulare	14	-	1	3	1	1	2	3	2	
Total shrubs	56	1	10	17	16	19	26	32	34	

Table 11-4.--Cover development of herb component
(m²/0.01 ha or %), fig. 11-4.

Species	Succession year									
	Pre	1	2	3	4	5	6	7	8	
Arnica latifolia	37	32	54	30	17	2	-	-	-	
Berberis repens	3	-	1	3	2	4	4	6	3	
Carex concinnoides	-	-	2	2	8	11	17	18	24	
Chimaphila umbellata	2	-	-	-	-	-	-	-	-	
Clintonia uniflora	2	-	-	-	-	-	-	-	-	
Epilobium angustifolium	-	-	2	2	6	2	6	8	4	
Geranium bicknellii	-	5	-	-	-	-	-	-	-	
Linnaea borealis	6	-	1	1	2	2	2	2	5	
Pyrola secunda	1	-	-	-	-	-	-	-	-	
Thalictrum occidentale	2	-	-	-	-	-	1	1	1	
Viola orbiculata	1	-	-	-	-	-	-	-	-	
Xerophyllum tenax	6	-	2	2	6	7	6	6	7	
Misc. herbs	6	2	5	4	7	12	9	5	7	
Total herbs	66	39	67	46	47	42	45	47	51	

MC: W-15 (A-17-3)



Figure 11-3. Shrub cover.

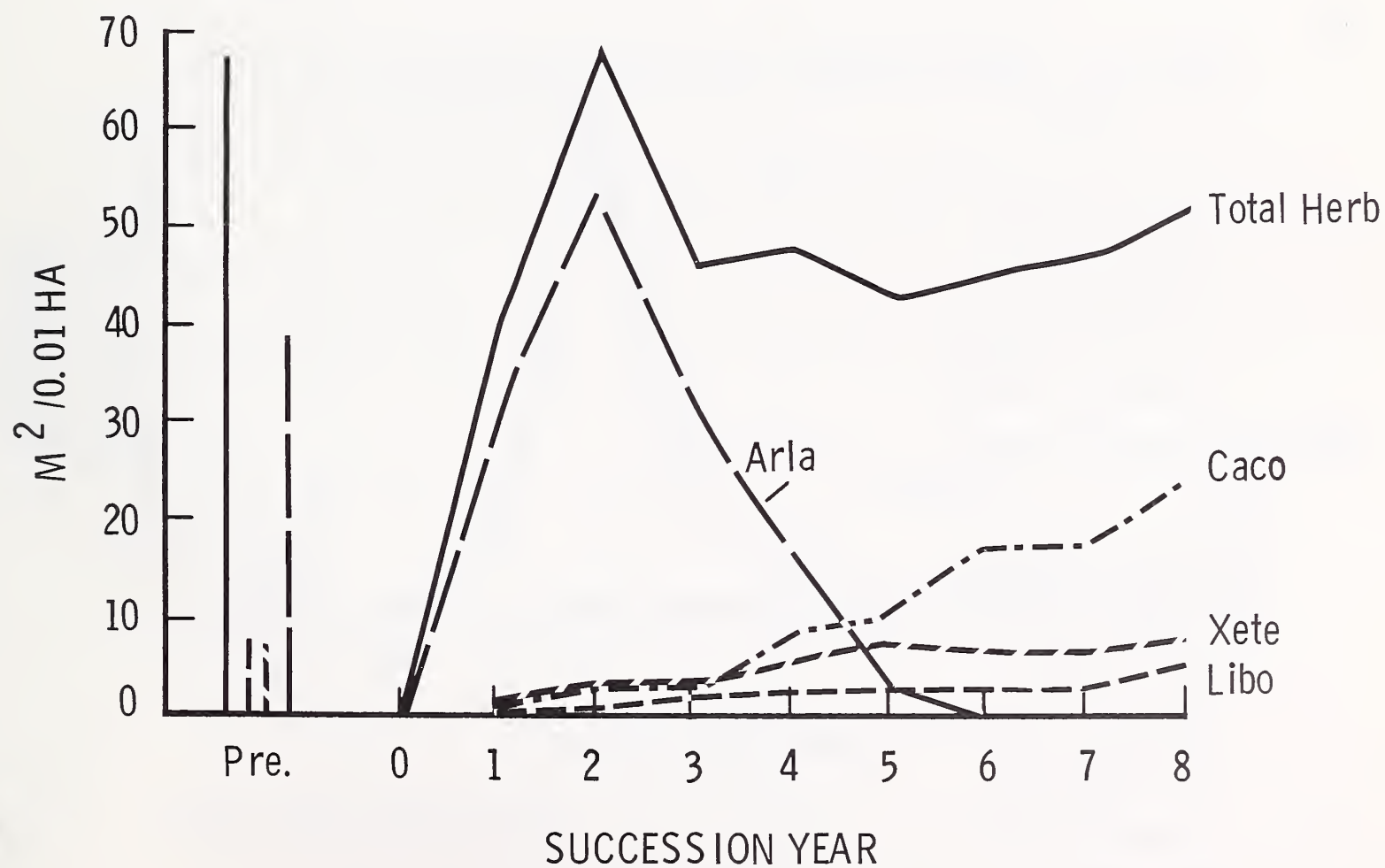


Figure 11-4. Herb cover.

MC: W-15 (A-17-3)

Table 11-5.--Volume development of shrub component (m³/0.01 ha), fig. 11-5.

Species	Succession year									
	Pre	1	2	3	4	5	6	7	8	
	:	:	:	:	:	:	:	:	:	
Acer glabrum	65.3	-	0.5	1.2	5.2	2.0	3.9	6.1	4.0	
Lonicera utahensis	1.1	-	.6	1.5	1.9	3.6	3.3	5.4	6.0	
Pachistima myrsinites	2.5	-	-	-	.2	.4	1.3	1.7	2.5	
Rosa gymnocarpa	.8	0.2	1.4	1.6	1.4	1.2	1.5	3.4	1.3	
Rubus parviflorus	.1	.1	.4	.1	.3	.4	.7	.7	.4	
Salix scouleriana	-	-	-	-	-	-	.3	.2	2.0	
Spiraea betulifolia	.2	-	.6	1.0	.6	1.0	.6	.2	1.6	
Symphoricarpos albus	-	-	-	-	-	-	-	-	<.1	
Taxus brevifolia	19.8	-	-	-	-	-	-	-	-	
Vaccinium globulare	7.4	-	.1	.7	.2	.2	.6	.7	.6	
Total shrubs	97.3	.4	3.5	6.0	9.7	8.7	12.2	18.3	18.4	

Table 11-6.-- Volume development of herb component (m³/0.01 ha), fig. 11-6.

Species	Succession year									
	Pre :	1 :	2 :	3 :	4 :	5 :	6 :	7 :	8	
<i>Arnica latifolia</i>	6.8	3.2	24.2	4.6	2.0	0.2	-	-	-	
<i>Berberis repens</i>	.7	-	.1	.4	.3	.4	0.5	0.6	0.4	
<i>Carex concinnoides</i>	-	-	.1	.1	.8	1.1	1.8	1.8	2.6	
<i>Chimaphila umbellata</i>	.2	-	-	-	-	-	-	-	-	
<i>Clintonia uniflora</i>	.1	-	-	-	-	-	-	-	-	
<i>Epilobium angustifolium</i>	-	-	.8	1.2	3.3	1.5	2.5	4.7	2.1	
<i>Geranium bicknellii</i>	-	.4	-	-	-	-	-	-	-	
<i>Linnaea borealis</i>	.3	-	<.1	<.1	.1	.1	.1	.1	.2	
<i>Pyrola secunda</i>	<.1	-	-	-	-	-	-	-	-	
<i>Thalictrum occidentale</i>	.6	-	-	-	-	-	.2	.4	.1	
<i>Viola orbiculata</i>	<.1	-	-	-	-	-	-	-	-	
<i>Xerophyllum tenax</i>	1.4	-	.5	.5	1.1	1.3	1.2	1.3	1.7	
Misc. herbs	.5	.3	.7	.5	1.2	2.1	1.4	.6	1.2	
Total herbs	10.6	3.9	26.4	7.4	8.8	6.7	7.6	9.6	8.3	



Figure 11-5. Shrub volume.

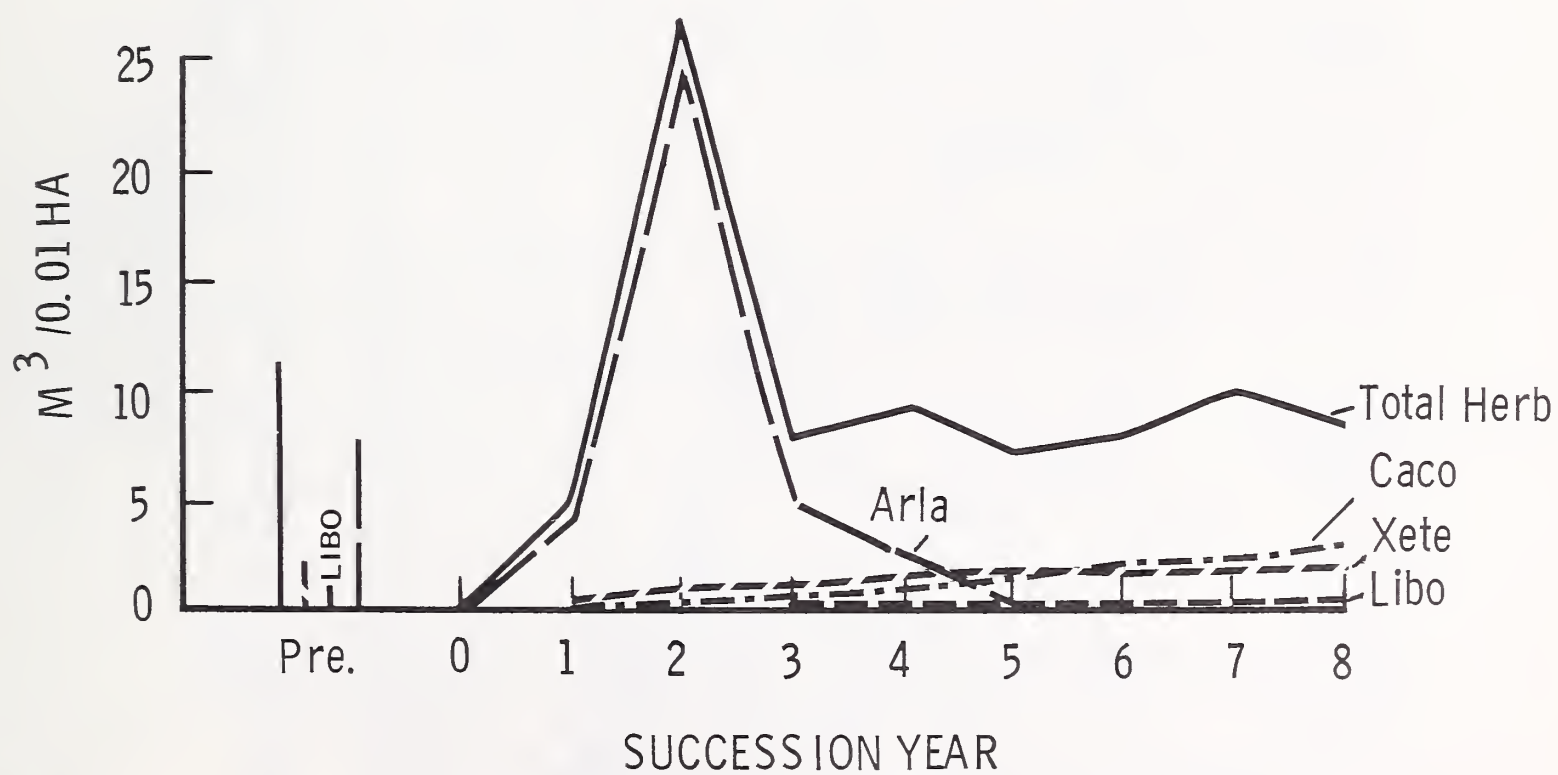


Figure 11-6. Herb volume.

NEWMAN RIDGE: North-2 (1802-13 Area 26)

Site location and description: SW $\frac{1}{4}$ SE $\frac{1}{4}$ Sec. 26, T18N R29W MPM.

Elevation: 5,000 ft; Exposure: Northeast (Az. 41 $\frac{1}{4}$); Slope: 60%

Habitat type: Thuja plicata/Clintonia uniflora, Menziesia ferruginea
Phase

Predisturbance forest stand: Laoc 61%, Psme 14%, Abgr 11%, Abia 8%,

Thpl 3%, Pien 2% (Stand basal area: 6,788 cm²/0.01 ha)

Disturbance treatment: Logged August 1968; Slashed June 1969;

Broadcast-burned: July 25, 1969 (Succession year 1:1970)

Fire intensity: 1,297 g water loss; Duff moisture: Upper 16%,

Lower 63%; Postfire duff depth: 2.7 cm (49% of preburn depth)

Table 12-1.--Successional development of vegetative cover
(m²/0.01 ha or %), fig. 12-1.

Life-form component	Succession year							
	Pre	1	2	3	4	5	6	7
Tree	-	1	1	-	-	-	-	2
Shrub	24	13	17	13	35	35	49	49
Herb	49	32	62	56	49	48	54	53
Total veg.	73	46	80	68	84	83	103	104
Exposed ground surface:								
Bare ground	-	16	-	-	-	-	-	-
Rock	-	-	1	-	-	-	-	-
Litter	50	32	13	24	20	17	10	11
Moss	-	7	6	10	17	10	10	11

Table 12-2.--Successional development of vegetative volume
(m³/0.01 ha), fig. 12-2.

Life-form component	Succession year							
	Pre	1	2	3	4	5	6	7
Tree	-	0.1	0.2	-	-	-	-	2.5
Shrub	24.6	1.5	3.3	3.8	18.4	16.0	27.6	30.8
Herb	7.9	5.9	20.4	15.5	14.2	15.9	13.5	15.8
Total veg.	32.5	7.6	23.8	19.3	32.6	32.0	41.1	49.2

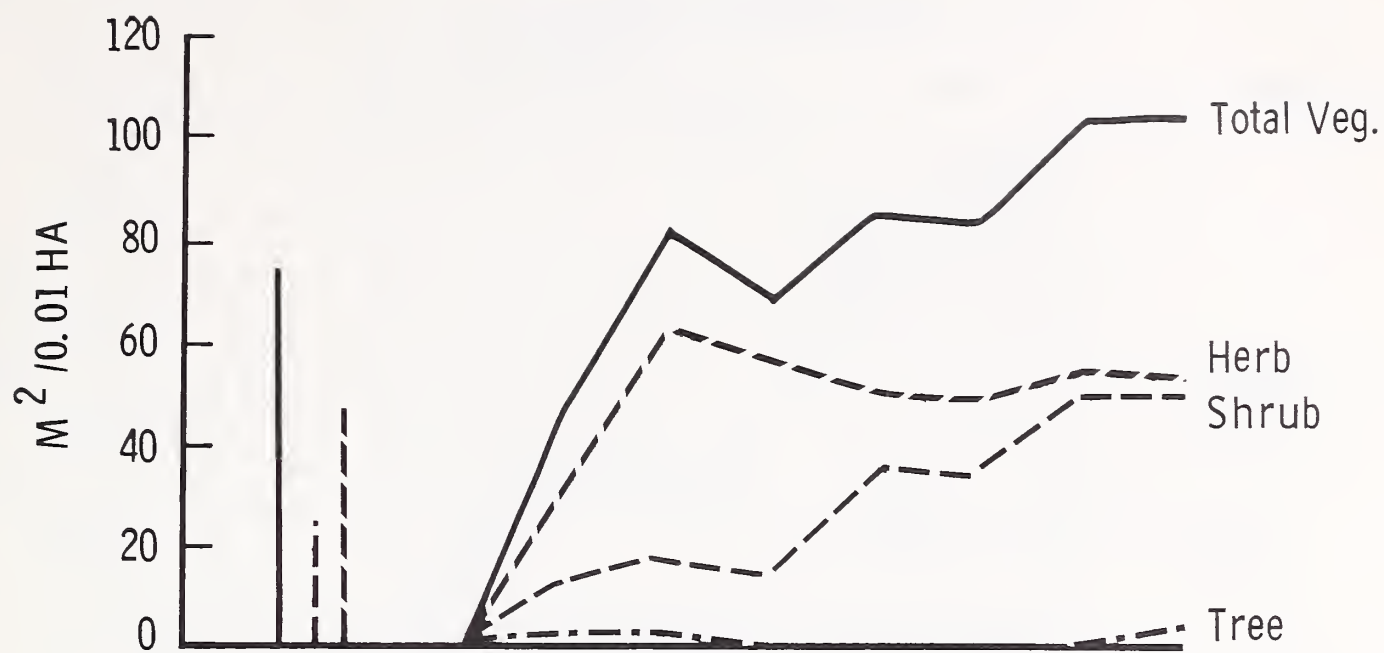


Figure 12-1. Vegetative cover.

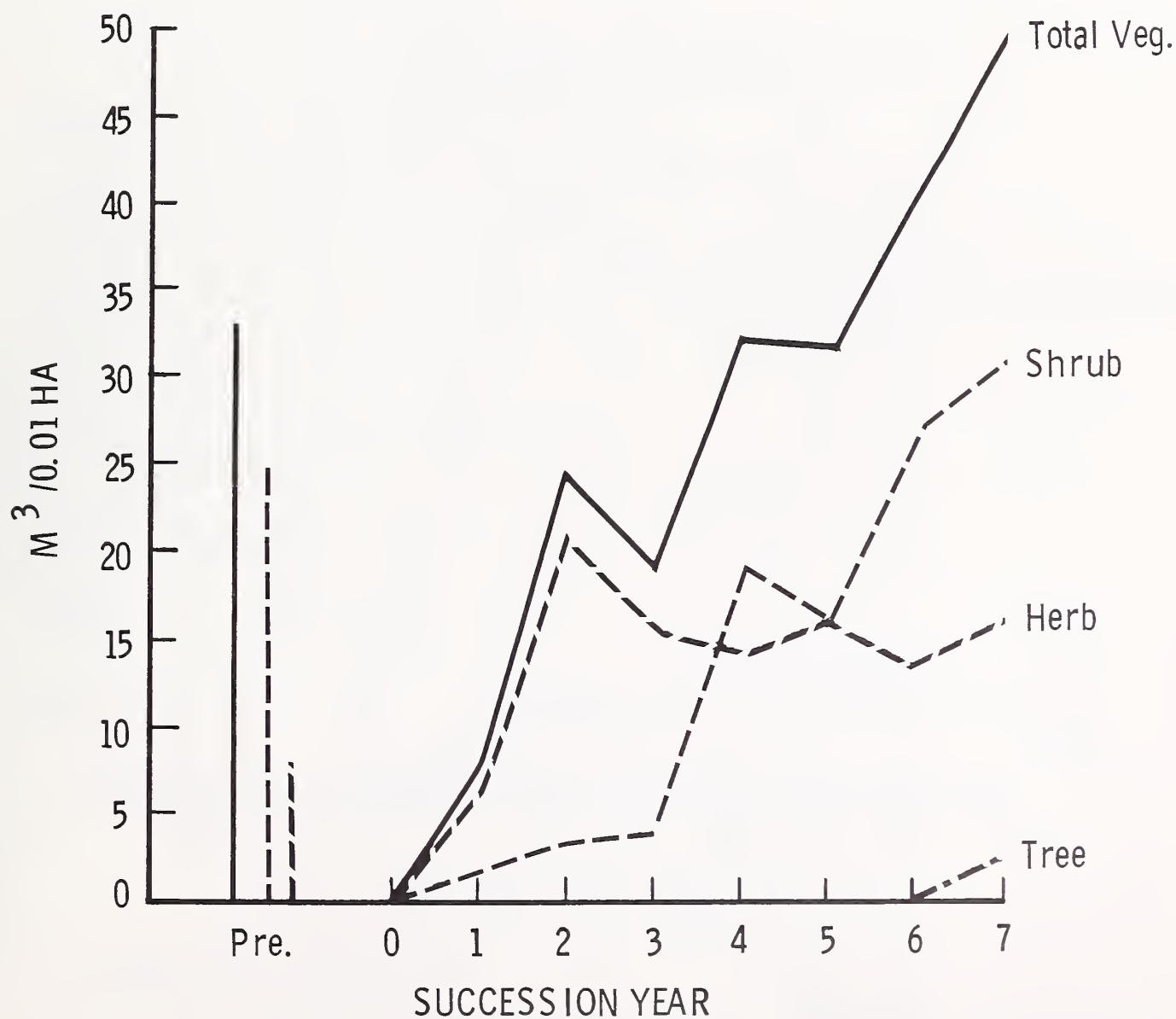


Figure 12-2. Vegetative volume.

NR: N-2 (A-26)

Table 12-3.--Cover development of shrub component
(m²/0.01 ha or %), fig. 12-3.

Species	Succession year							
	Pre	1	2	3	4	5	6	7
<i>Acer glabrum</i>	3	-	-	-	<1	-	-	-
<i>Amelanchier alnifolia</i>	-	-	-	-	1	-	-	-
<i>Lonicera utahensis</i>	2	-	-	-	-	-	-	-
<i>Menziesia ferruginea</i>	10	-	-	-	-	-	-	-
<i>Pachistima myrsinites</i>	-	-	-	-	-	-	-	1
<i>Ribes viscosissimum</i>	-	1	1	1	11	8	10	8
<i>Rubus parviflorus</i>	-	12	14	8	13	17	21	21
<i>Salix scouleriana</i>	-	-	-	2	6	7	14	16
<i>Sambucus racemosa</i>	-	-	1	-	<1	-	-	1
<i>Vaccinium globulare</i>	9	1	1	2	3	2	4	3
Total shrubs	24	13	17	13	35	35	49	49

Table 12-4.--Cover development of herb component
(m²/0.01 ha or %), fig. 12-4.

Species	Succession year							
	Pre	1	2	3	4	5	6	7
<i>Anemone piperi</i>	-	1	11	11	5	1	3	-
<i>Arenaria macrophylla</i>	-	-	-	-	1	-	2	-
<i>Arnica latifolia</i>	5	5	5	3	2	1	-	2
<i>Carex concinnoides</i>	-	-	-	-	2	2	2	4
<i>Carex geyeri</i>	-	-	-	-	-	-	-	1
<i>Carex rossii</i>	-	1	8	9	11	12	8	8
<i>Clintonia uniflora</i>	3	-	-	-	-	-	2	2
<i>Coptis occidentalis</i>	17	-	1	1	1	2	2	3
<i>Disporum hookeri</i>	6	2	5	3	3	7	5	7
<i>Epilobium angustifolium</i>	-	5	11	10	12	12	12	15
<i>Epilobium paniculatum</i>	-	-	5	1	-	-	-	-
<i>Epilobium watsonii</i>	-	3	2	2	-	-	-	-
<i>Galium triflorum</i>	1	-	-	-	-	-	-	-
<i>Geranium bicknellii</i>	-	6	1	-	-	-	-	-
<i>Hieracium albiflorum</i>	-	-	-	-	-	-	2	3
<i>Osmorhiza chilensis</i>	1	-	-	-	-	-	-	-
<i>Thalictrum occidentale</i>	2	2	3	4	3	6	2	2
<i>Trillium ovatum</i>	1	-	1	-	-	-	1	-
Misc. herbs	12	7	9	11	9	7	12	6
Total herbs	49	32	62	56	49	48	54	53

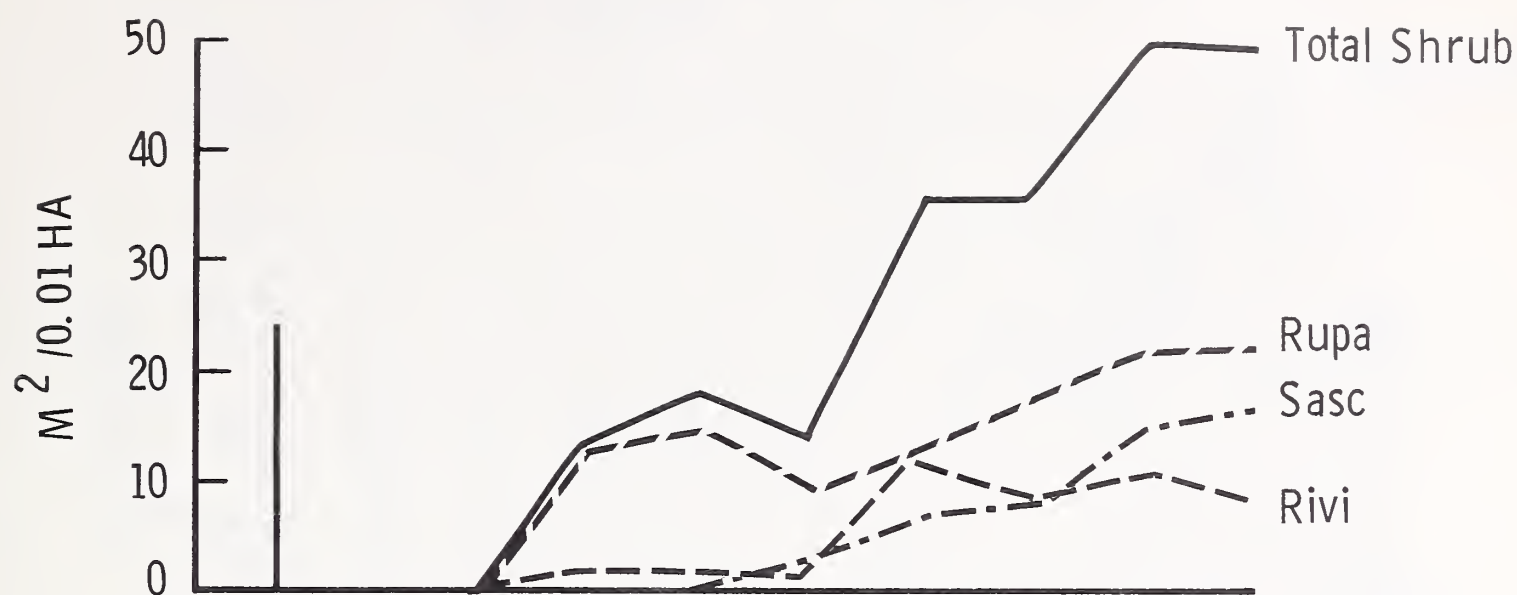


Figure 12-3. Shrub cover.

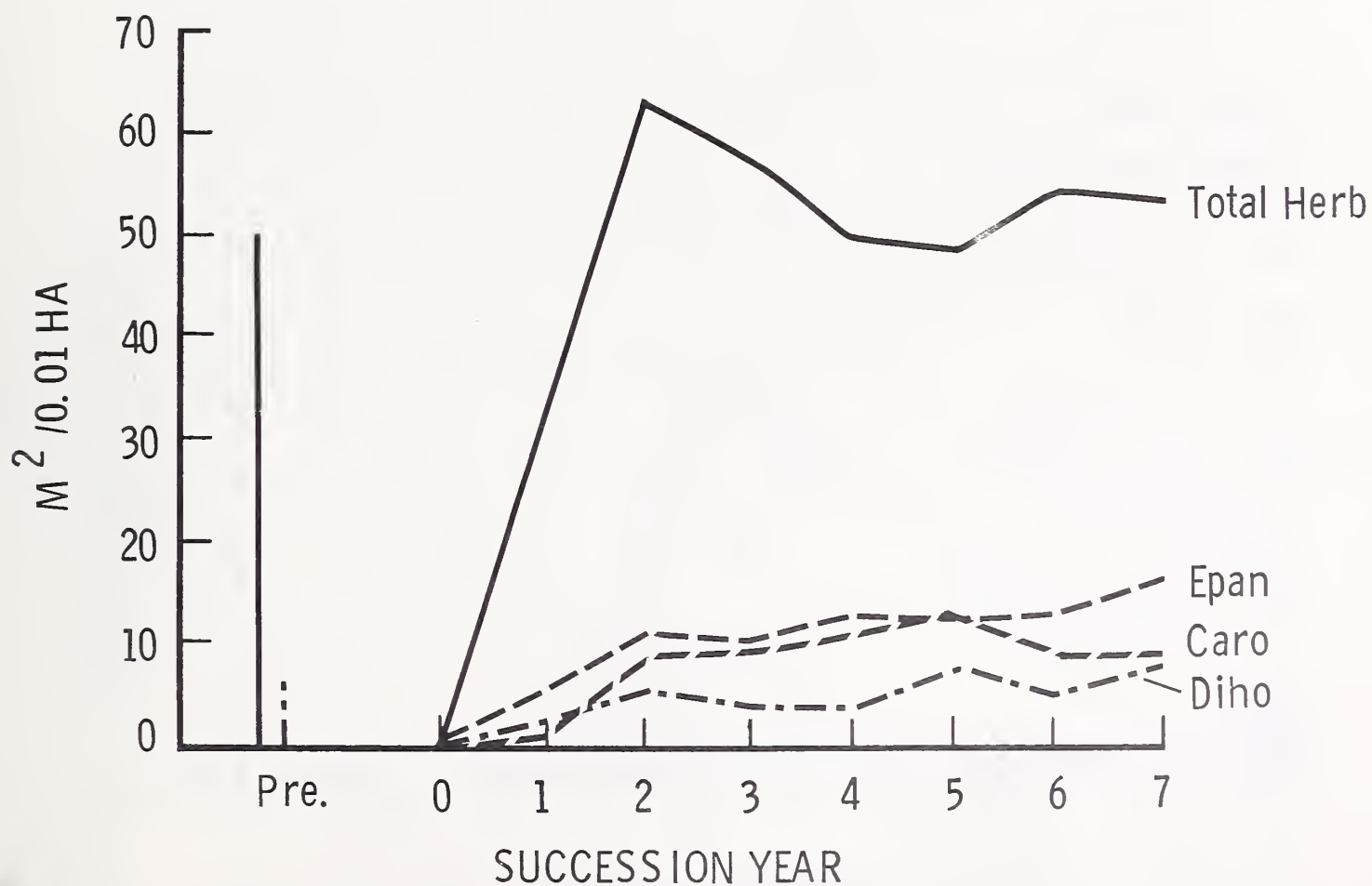


Figure 12-4. Herb cover.

Table 12-5.--Volume development of shrub component ($m^3/0.01$ ha), fig. 12-5.

Species	Succession year								
	Pre	1	2	3	4	5	6	7	
Acer glabrum	8.4	-	-	-	0.3	-	-	-	
Amelanchier alnifolia	-	-	-	-	.9	-	-	-	
Lonicera utahensis	1.5	-	-	-	-	-	-	-	
Menziesia ferruginea	9.9	-	-	-	-	-	-	-	
Pachistima myrsinites	-	-	-	-	-	-	-	0.1	
Ribes viscosissimum	-	0.1	0.2	0.2	6.6	4.0	6.0	5.1	
Rubus parviflorus	-	1.3	2.5	1.8	3.7	4.7	5.4	6.1	
Salix scouleriana	-	-	-	1.2	5.6	6.7	14.9	17.6	
Sambucus racemosa	-	-	.3	-	.1	-	-	.5	
Vaccinium globulare	4.8	.2	.2	.5	1.1	.8	1.3	1.4	
Total shrubs	24.6	1.5	3.3	3.8	18.4	16.0	27.6	30.8	

Table 12-6.--Volume development of herb component ($m^3/0.01$ ha), fig. 12-6.

Species	Succession year								
	Pre	1	2	3	4	5	6	7	
Anemone piperi	-	<0.1	1.4	1.5	0.6	0.1	0.3	-	
Arenaria macrophylla	-	-	-	-	<.1	-	.2	-	
Arnica latifolia	0.8	.5	2.4	.3	.2	.1	-	0.1	
Carex concinnoides	-	-	-	-	.2	.2	.2	.4	
Carex geyeri	-	-	-	-	-	-	-	.2	
Carex rossii	-	<.1	1.2	1.3	1.2	1.5	1.0	1.1	
Clintonia uniflora	.2	-	-	-	-	-	.1	.1	
Coptis occidentalis	2.2	-	.1	<.1	<.1	.2	.1	.2	
Disporum hookeri	1.7	.3	1.8	1.1	1.3	1.8	1.3	1.8	
Epilobium angustifolium	-	2.0	6.0	7.4	8.0	9.2	7.8	9.6	
Epilobium paniculatum	-	-	2.1	<.1	-	-	-	-	
Epilobium watsonii	-	1.1	1.2	.1	-	-	-	-	
Galium triflorum	<.1	-	-	-	-	-	-	-	
Geranium bicknellii	-	1.0	.2	-	-	-	-	-	
Hieracium albiflorum	-	-	-	-	-	-	.3	.3	
Osmorhiza chilensis	.2	-	-	-	-	-	-	-	
Thalictrum occidentale	1.4	.5	1.5	1.5	1.2	1.9	1.0	.6	
Trillium ovatum	.2	-	.2	-	-	-	.1	-	
Misc. herbs	1.2	.4	1.7	2.2	1.4	.8	1.1	1.4	
Total herbs	7.9	5.9	20.4	15.5	14.2	15.9	13.5	15.8	

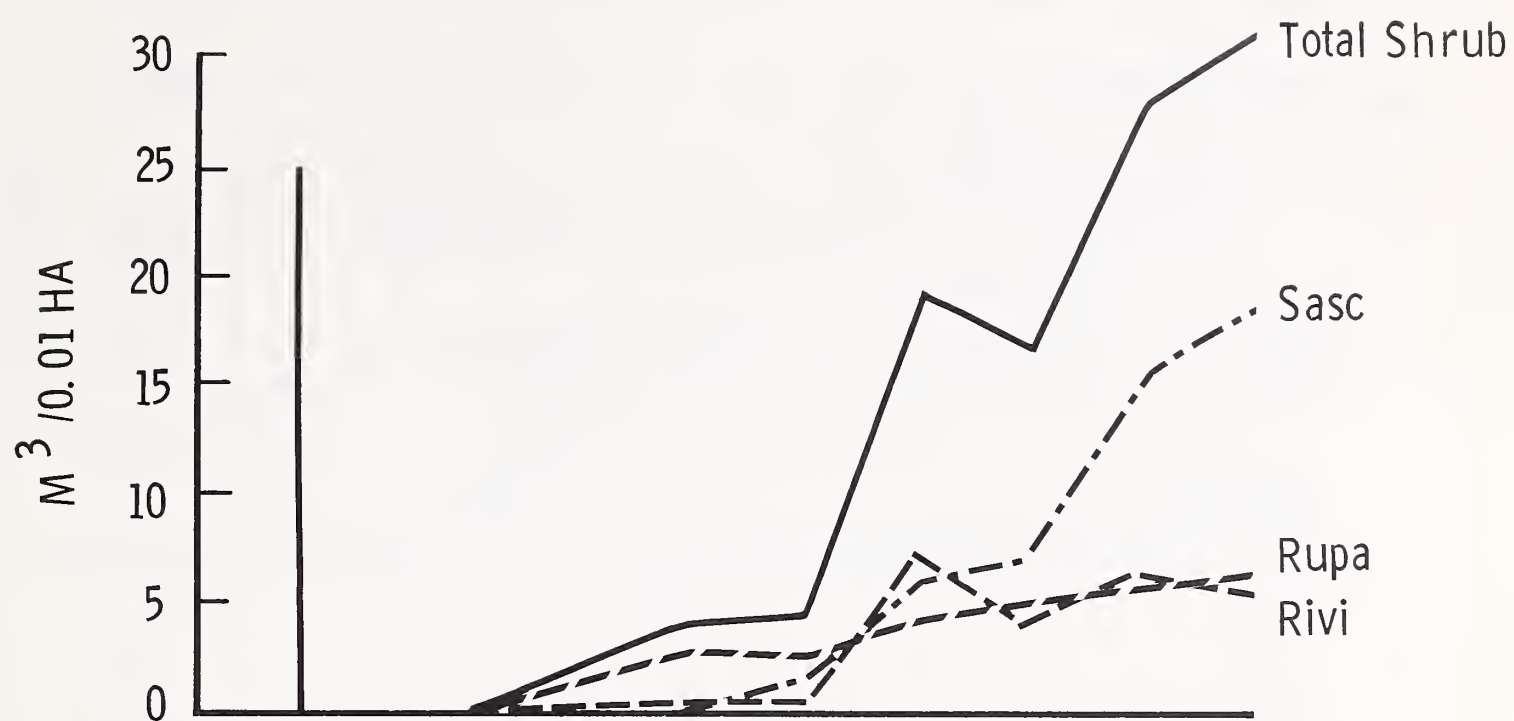


Figure 12-5. Shrub volume.

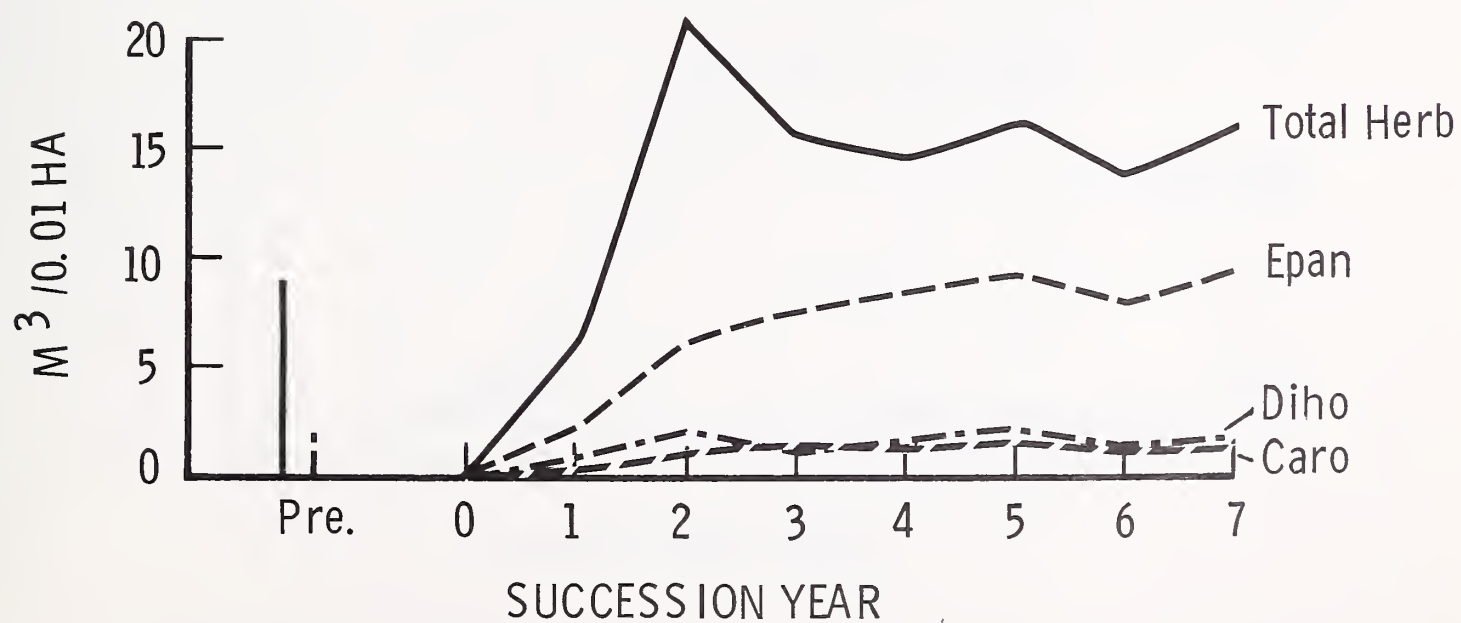


Figure 12-6. Herb volume.

NEWMAN RIDGE: East-3 (1802-13 Area 27)

Site location and description: SW $\frac{1}{4}$ NW $\frac{1}{4}$ Sec. 35, T18N R29W MPM.

Elevation: 5,300 ft; Exposure: East (Az. 104°); Slope: 55%

Habitat type: *Abies grandis*/*Clintonia uniflora*, *Xerophyllum tenax*

Phase

Predisturbance forest stand: Pico 38%, Psme 26%, Laoc 16%, Pien 12%,

Abla 5%, Abgr 3% (Stand basal area 4,207 cm²/0.01 ha)

Disturbance treatment: Logged June 1969; Slashed June 1969;

Broadcast-burned: July 25, 1969 (Succession year 1:1970)

Fire intensity: 820 g water loss; Duff moisture: Upper 16%,

Lower 63%; Postfire duff depth: 2.0 cm (65% of preburn depth)

Table 13-1.--Successional development of vegetative cover
(m²/0.01 ha or %), fig. 13-1.

Life-form component	Succession year							
	Pre	1	2	3*	4	5	6	7
Tree	-	-	-		-	1	-	2
Shrub	45	11	12		17	34	46	40
Herb	29	20	37		41	44	39	37
Total veg.	74	31	48		58	78	85	80
Exposed ground surface:								
Bare ground	-	17	10		5	3	5	-
Rock	-	-	-		-	-	-	-
Litter	52	46	34		24	18	22	16
Moss	-	7	11		16	9	12	25

Table 13-2.--Successional development of vegetative volume
(m³/0.01 ha), fig. 13-2.

Life-form component	Succession year							
	Pre	1	2	3*	4	5	6	7
Tree	-	-	-		-	0.3	-	1.7
Shrub	29.0	1.0	3.5		6.2	12.0	25.1	19.8
Herb	3.8	2.2	9.7		12.8	12.9	10.7	10.6
Total veg.	32.8	3.2	13.2		19.0	25.2	35.7	32.1

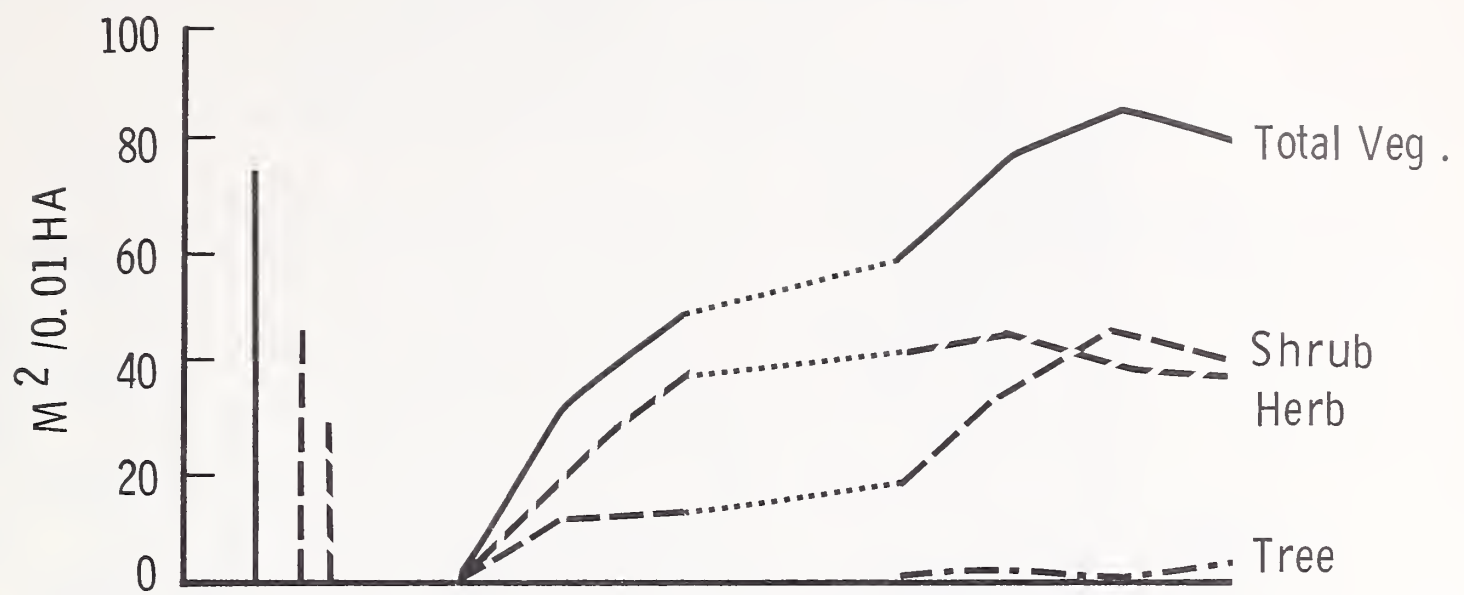


Figure 13-1. Vegetative cover.

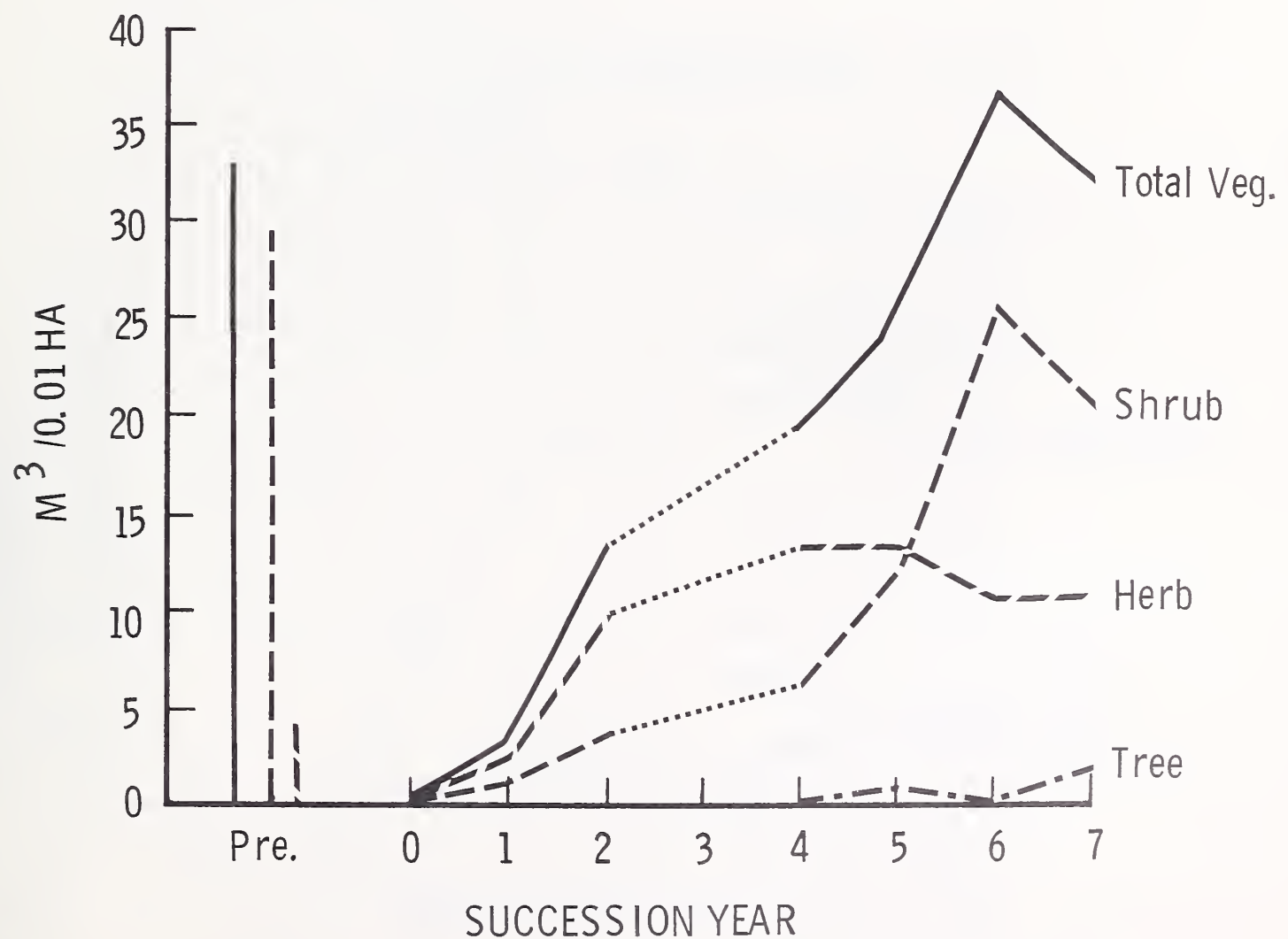


Figure 13-2. Vegetative volume.

NR: E-3 (A-27)

Table 13-3.--Cover development of shrub component
(m²/0.01 ha or %), fig. 13-3.

Species	Succession year							
	Pre	1	2	3*	4	5	6	7
<i>Acer glabrum</i>	5	-	1		2	1	5	2
<i>Amelanchier alnifolia</i>	1	-	-		-	-	-	-
<i>Ceanothus velutinus</i>	-	8	3		2	8	11	12
<i>Lonicera utahensis</i>	1	-	-		-	-	-	-
<i>Pachistima myrsinites</i>	-	-	-		-	-	-	2
<i>Ribes viscosissimum</i>	2	-	-		2	3	6	6
<i>Rosa gymnocarpa</i>	-	-	-		-	1	-	-
<i>Rubus parviflorus</i>	10	1	2		1	3	3	3
<i>Salix scouleriana</i>	-	-	-		-	<1	-	<1
<i>Spiraea betulifolia</i>	1	2	3		6	8	8	6
<i>Vaccinium globulare</i>	25	1	2		6	9	13	9
Total shrubs	45	11	12		17	34	46	40

Table 13-4.--Cover development of herb component
(m²/0.01 ha or %), fig. 13-4.

Species	Succession year							
	Pre	1	2	3*	4	5	6	7
<i>Anaphalis margaritaceae</i>	-	-	-		-	-	1	1
<i>Anemone piperi</i>	2	2	5		7	7	4	1
<i>Arenaria macrophylla</i>	-	2	4		2	4	2	1
<i>Calamagrostis rubescens</i>	3	2	2		2	7	5	6
<i>Carex concinnoides</i>	-	-	-		-	-	1	2
<i>Carex geyeri</i>	3	-	-		-	-	-	1
<i>Carex rossii</i>	-	-	2		6	6	8	6
<i>Chimaphila umbellata</i>	1	-	-		-	-	-	-
<i>Clintonia uniflora</i>	2	-	-		-	-	-	-
<i>Coptis occidentalis</i>	2	-	-		-	-	-	-
<i>Epilobium angustifolium</i>	-	2	7		13	10	8	8
<i>Epilobium paniculatum</i>	-	-	1		-	-	-	-
<i>Epilobium watsonii</i>	-	-	2		-	-	-	-
<i>Geranium bicknellii</i>	-	1	-		-	-	-	-
<i>Gnaphalium microcephalum</i>	-	-	2		-	-	-	-
<i>Hieracium albiflorum</i>	-	-	-		-	-	2	2
<i>Pteridium aquilinum</i>	-	1	2		2	3	1	2
<i>Thalictrum occidentale</i>	1	-	-		-	-	-	-
<i>Xerophyllum tenax</i>	8	-	1		-	-	2	-
Misc. herbs	7	10	8		9	8	8	6
Total herbs	29	20	37		41	44	39	37

*No data taken

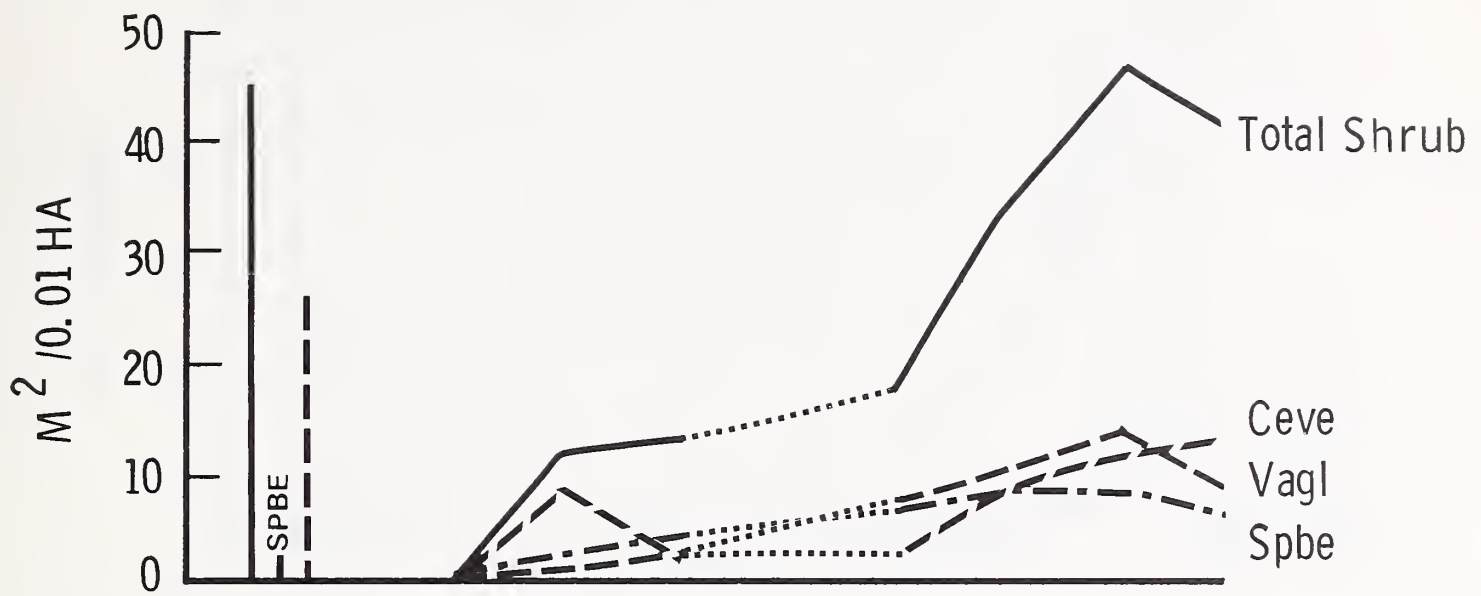


Figure 13-3. Shrub cover.

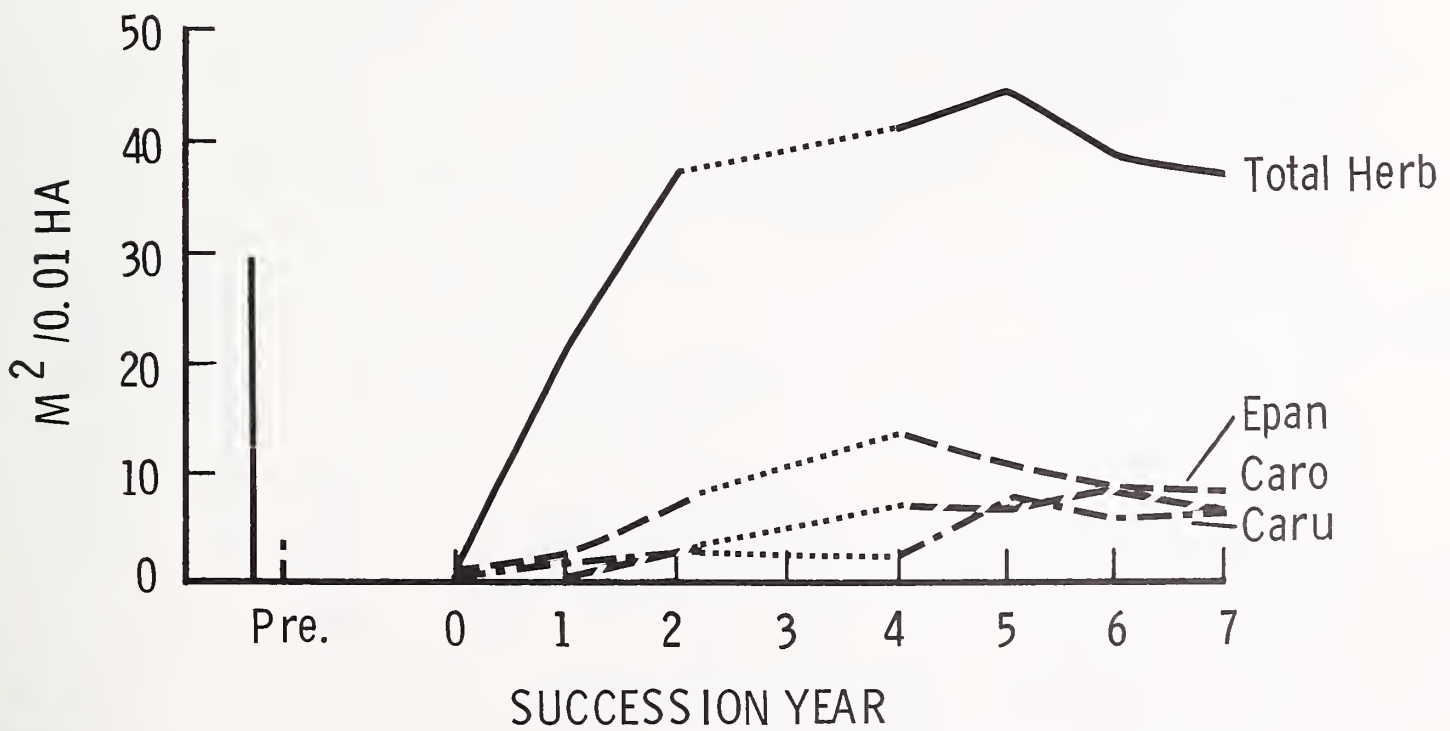


Figure 13-4. Herb cover.

Table 13-5.--Volume development of shrub component ($m^3/0.01$ ha), fig. 13-5.

Species	Succession year							
	Pre	1	2	3*	4	5	6	7
<i>Acer glabrum</i>	10.8	-	1.0		1.6	1.1	6.3	2.1
<i>Amelanchier alnifolia</i>	.1	-	-		-	-	-	-
<i>Ceanothus velutinus</i>	-	0.4	.3		.4	2.6	6.9	7.8
<i>Lonicera utahensis</i>	.4	-	-		-	-	-	-
<i>Pachistima myrsinites</i>	-	-	-		-	-	-	.5
<i>Ribes viscosissimum</i>	1.4	-	-		.6	1.5	3.9	3.1
<i>Rosa gymnocarpa</i>	-	-	-		-	.4	-	-
<i>Rubus parviflorus</i>	3.3	.1	.8		.2	1.2	1.6	1.1
<i>Salix scouleriana</i>	-	-	-		-	.1	-	.6
<i>Spiraea betulifolia</i>	.2	.3	.8		2.1	2.6	3.1	1.9
<i>Vaccinium globulare</i>	12.8	.2	.6		1.5	2.4	3.2	2.8
Total shrubs	29.0	1.0	3.5		6.2	12.0	25.1	19.8

Table 13-6.--Volume development of herb component ($m^3/0.01$ ha), fig. 13-6.

Species	Succession year							
	Pre	1	2	3*	4	5	6	7
<i>Anaphalis margaritaceae</i>	-	-	-		-	-	0.2	0.2
<i>Anemone piperi</i>	0.2	0.1	0.5		1.0	0.8	.4	.1
<i>Arenaria macrophylla</i>	-	.1	.2		.1	.2	.1	<.1
<i>Calamagrostis rubescens</i>	.3	.2	.8		.3	1.8	1.1	1.3
<i>Carex concinnoides</i>	-	-	-		-	-	.1	.2
<i>Carex geyeri</i>	.3	-	-		-	-	-	.2
<i>Carex rossii</i>	-	-	.3		1.0	1.1	1.2	.9
<i>Chimaphila umbellata</i>	.1	-	-		-	-	-	-
<i>Clintonia uniflora</i>	.1	-	-		-	-	-	-
<i>Coptis occidentalis</i>	.2	-	-		-	-	-	-
<i>Epilobium angustifolium</i>	-	.6	3.0		7.9	6.3	5.0	4.9
<i>Epilobium paniculatum</i>	-	-	.4		-	-	-	-
<i>Epilobium watsonii</i>	-	-	.8		-	-	-	-
<i>Geranium bicknellii</i>	-	.1	-		-	-	-	-
<i>Gnaphalium microcephalum</i>	-	-	1.7		-	-	-	-
<i>Hieracium albiflorum</i>	-	-	-		-	-	.2	.5
<i>Pteridium aquilinum</i>	-	.2	.5		.6	1.3	.3	1.0
<i>Thalictrum occidentale</i>	.3	-	-		-	-	-	-
<i>Xerophyllum tenax</i>	1.4	-	.2		-	-	.3	-
Misc. herbs	.9	1.0	1.4		1.9	1.4	1.6	1.2
Total herbs	3.8	2.2	9.7		12.8	12.9	10.7	10.6

*No data taken

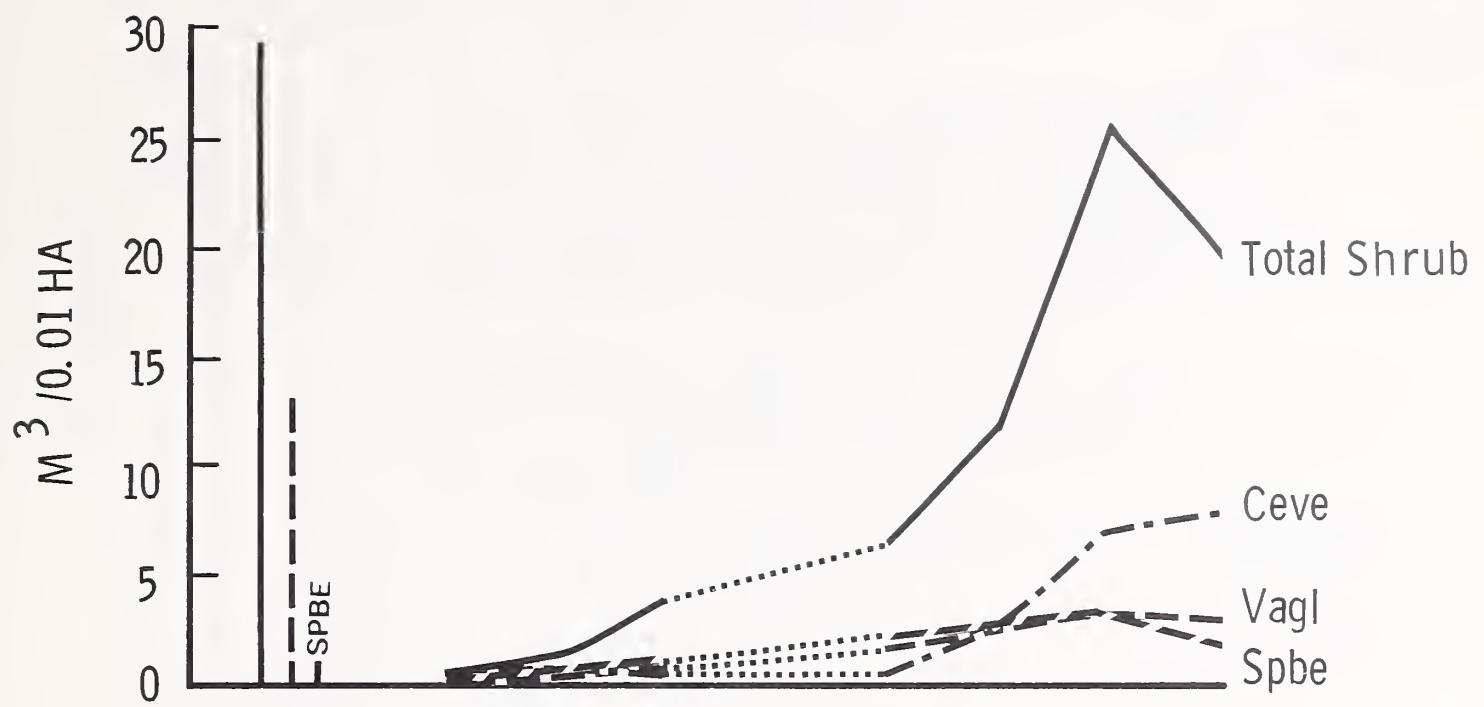


Figure 13-5. Shrub volume.

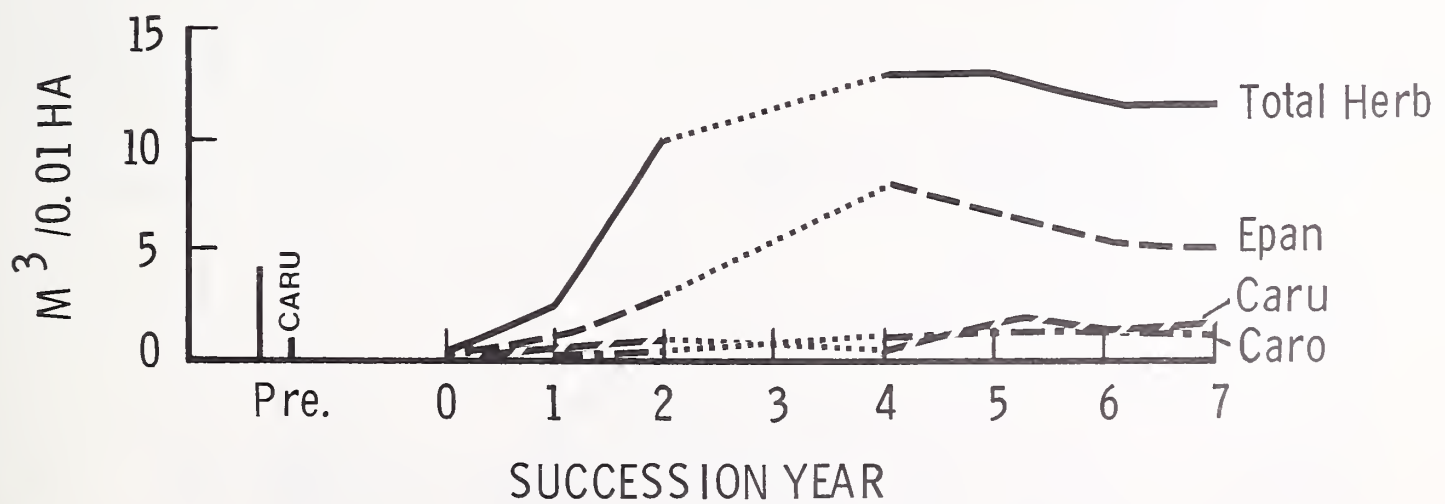


Figure 13-6. Herb volume.

NEWMAN RIDGE: South-2 (1802-13 Area 24)

Site location and description: SE $\frac{1}{4}$ SW $\frac{1}{4}$ Sec. 26, T18N R29W MPM.

Elevation: 5,100 ft; Exposure: Southeast (Az. 131°); Slope: 35%

Habitat type: *Abies grandis*/*Clintonia uniflora*, *Xerophyllum tenax*

Phase

Predisturbance forest stand: Pico 62%, Laoc 28%, Psme 9%, Abgr 1%,

Abla 1% (Stand basal area: 4,065 cm²/0.01 ha)

Disturbance treatment: Logged September 1968; Slashed November 1968;

Broadcast-burned: July 16, 1969 (Succession year 1:1970)

Fire intensity: 813 g water loss; Duff moisture: Upper 43%,

Lower 73%; Postfire duff depth: 1.9 cm (43% of preburn)

Table 14-1.--Successional development of vegetative cover
(m²/0.01 ha or %), fig. 14-1.

Life-form component	Succession year														
	Pre	:	1	:	2	:	3	:	4	:	5	:	6	:	7
Tree	-		-		-		-		-		-		-		-
Shrub	62		17		26		28		31		52		67		86
Herb	53		19		35		42		37		39		44		37
Total veg.	115		36		61		70		69		91		111		124
Exposed ground surface:															
Bare ground	-		15		7		3		4		2		4		3
Rock	-		-		1		-		-		-		-		-
Litter	19		35		27		23		19		12		5		14
Moss	-		14		6		5		12		7		7		9

Table 14-2.--Successional development of vegetative volume
(m³/0.01 ha), fig. 14-2.

Life-form component	Succession year								
	Pre	1	2	3	4	5	6	7	
Tree	-	-	-	-	-	-	-	-	
Shrub	32.6	8.8	7.0	6.8	8.5	17.6	31.2	61.1	
Herb	10.6	2.5	8.6	8.9	9.9	9.8	12.5	10.4	
Total veg.	43.3	11.3	15.6	15.7	18.4	27.5	43.7	71.5	

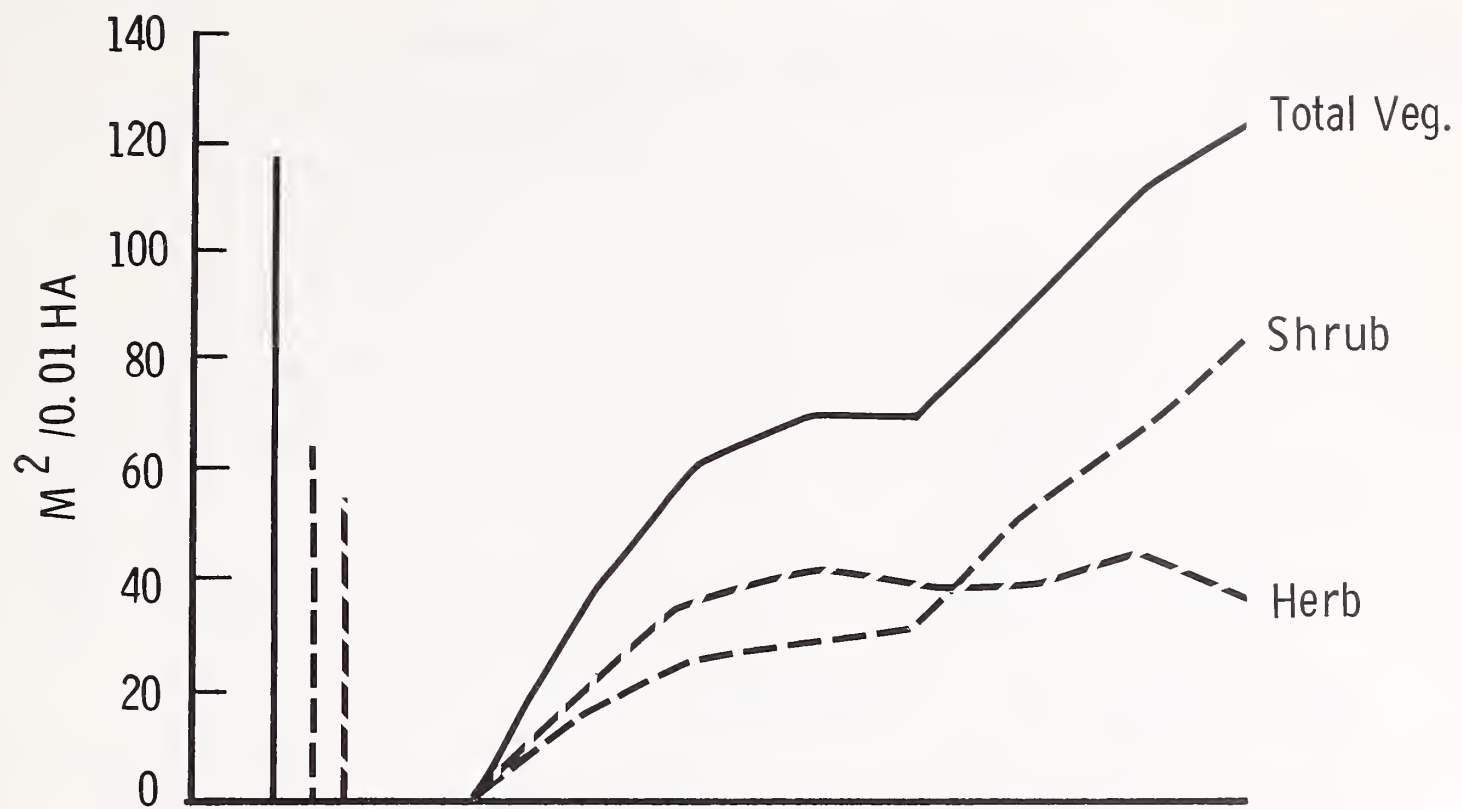


Figure 14-1. Vegetative cover.

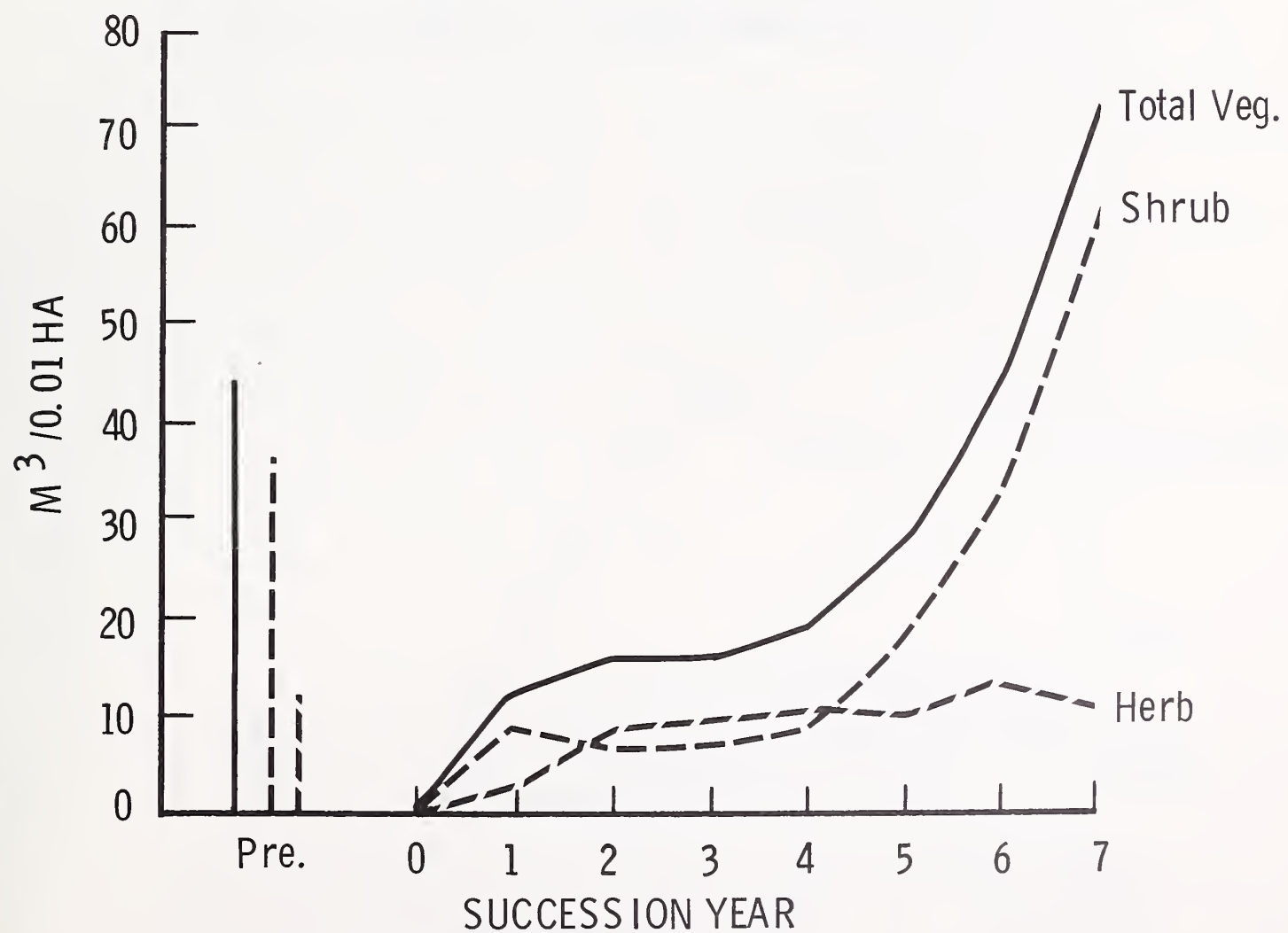


Figure 14-2. Vegetative volume.

NR: S-2 (A-24)

Table 14-3.--Cover development of shrub component
(m²/0.01 ha or %), fig. 14-3.

Species	Succession year								
	Pre	1	2	3	4	5	6	7	
Ceanothus velutinus	-	9	2	-	2	11	22	46	
Rosa gymnocarpa	2	1	2	2	3	5	5	3	
Salix scouleriana	-	-	-	<1	1	2	2	4	
Spiraea betulifolia	1	4	11	8	6	7	11	5	
Vaccinium globulare	59	2	11	18	19	27	27	28	
Total shrubs	62	17	26	28	31	52	67	86	

Table 14-4.--Cover development of herb component
(m²/0.01 ha or %), fig. 14-4.

Species	Succession year								
	Pre	1	2	3	4	5	6	7	
Anemone piperi	-	2	6	7	4	1	2	-	
Arenaria macrophylla	-	-	1	-	-	-	-	-	
Calamagrostis rubescens	2	2	3	4	5	11	11	8	
Carex concinnoides	-	-	-	1	-	-	-	2	
Carex geyeri	-	-	-	-	-	-	-	1	
Carex rossii	-	-	2	3	2	4	5	4	
Clintonia uniflora	1	-	-	-	-	-	-	-	
Coptis occidentalis	2	-	-	-	-	-	-	-	
Epilobium angustifolium	-	1	2	6	5	4	6	4	
Hieracium albiflorum	1	-	-	-	-	-	-	-	
Pteridium aquilinum	-	-	2	-	1	-	2	-	
Xerophyllum tenax	36	7	10	12	12	13	13	16	
Misc. herbs	12	8	9	9	8	6	5	2	
Total herbs	53	19	35	42	37	39	44	37	

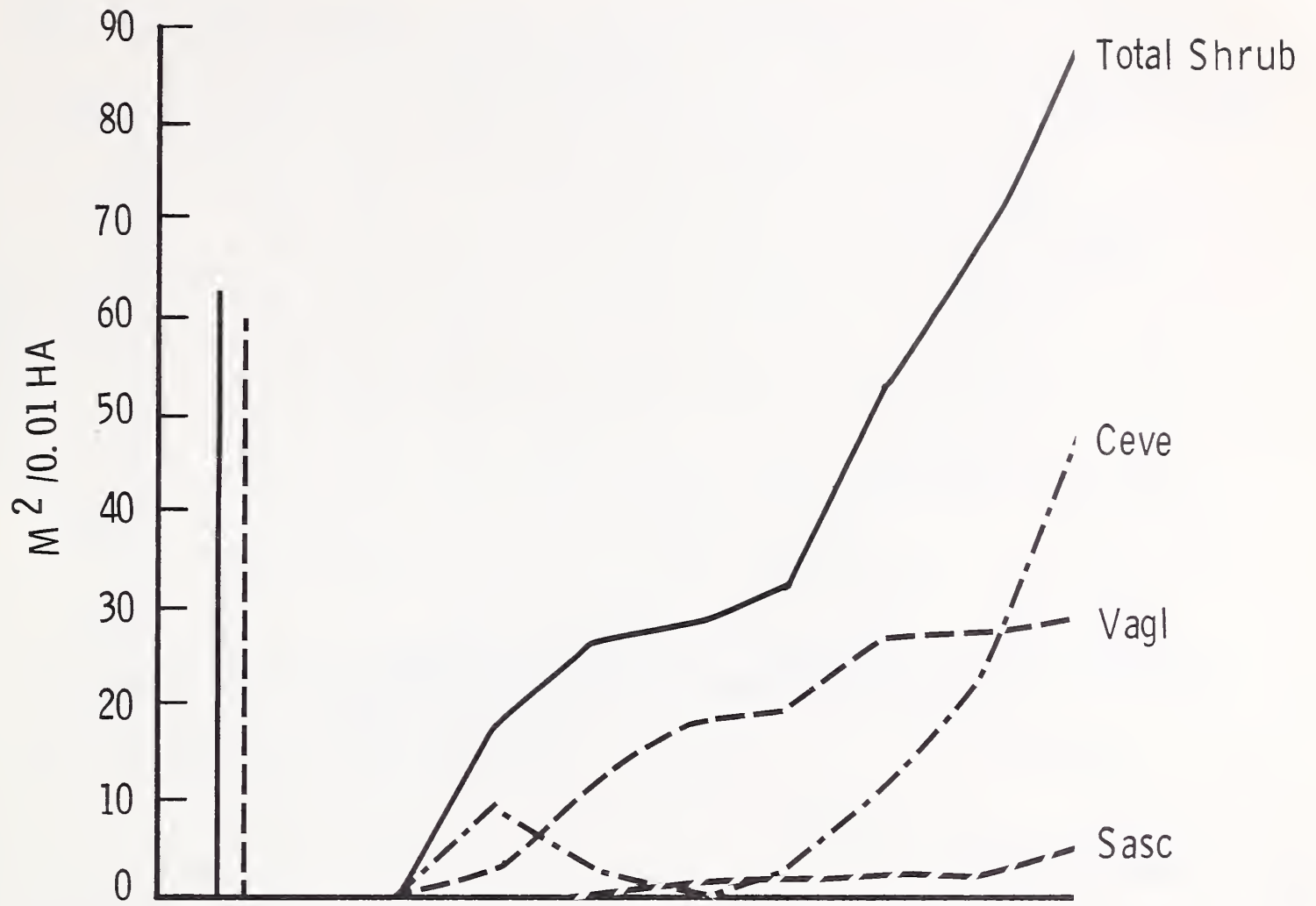


Figure 14-3. Shrub cover.

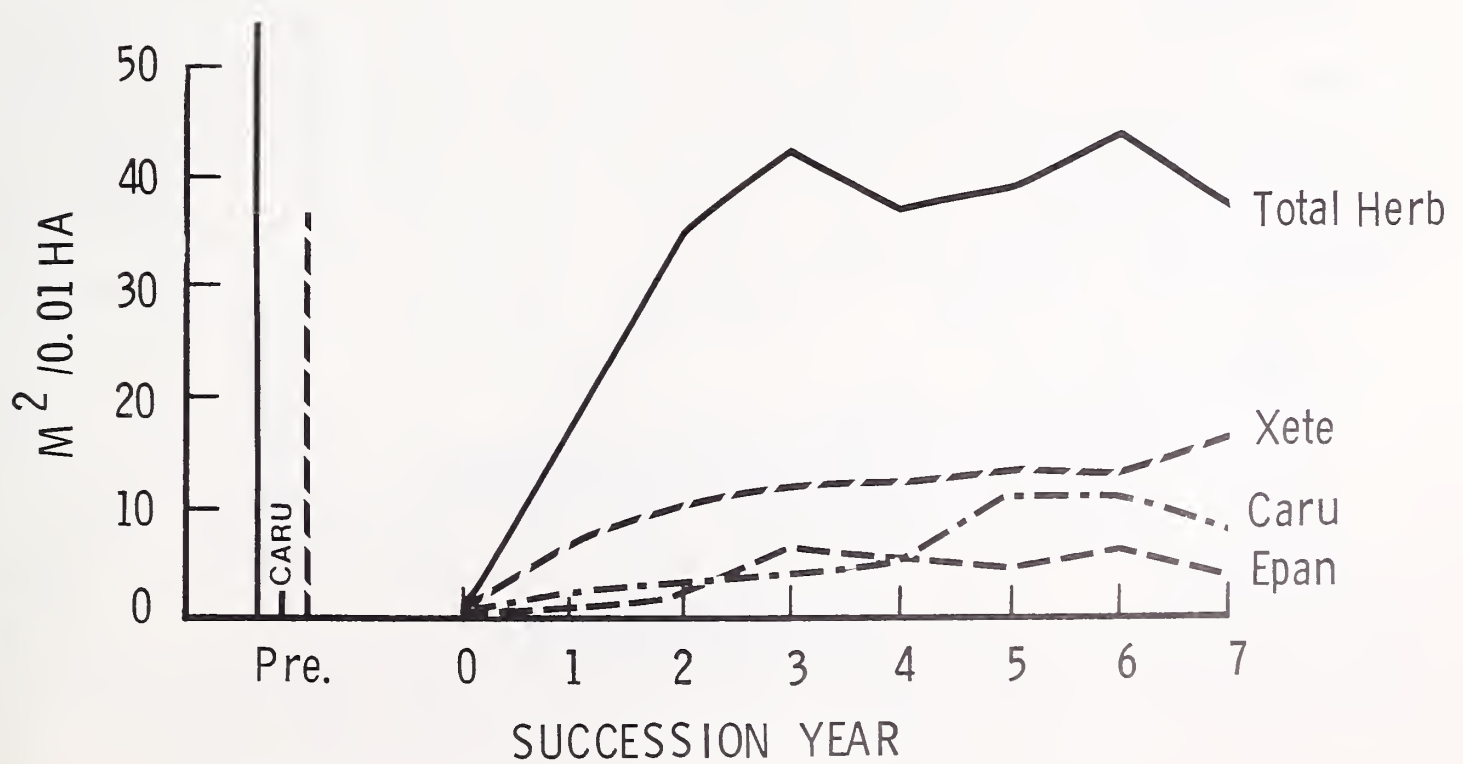


Figure 14-4. Herb cover.

Table 14-5.--Volume development of shrub component ($\text{m}^3/0.01 \text{ ha}$), fig. 14-5.

Species	Succession year								
	Pre	: 1	: 2	: 3	: 4	: 5	: 6	: 7	
Ceanothus velutinus	-	4.6	0.1	-	1.0	6.0	17.3	46.8	
Rosa gymnocarpa	1.2	.2	.4	0.5	1.0	1.8	2.2	1.0	
Salix scouleriana	-	-	-	<.1	.6	1.3	1.7	4.4	
Spiraea betulifolia	.2	.7	4.4	2.6	1.9	2.6	3.8	1.5	
Vaccinium globulare	31.2	3.3	2.2	3.7	4.1	6.0	6.1	7.5	
Total shrubs	32.6	8.8	7.0	6.8	8.5	17.6	31.2	61.1	

Table 14-6.--Volume development of herb component ($\text{m}^3/0.01 \text{ ha}$), fig. 14-6.

Species	Succession year								
	Pre	: 1	: 2	: 3	: 4	: 5	: 6	: 7	
Anemone piperi	-	0.1	0.5	0.9	0.7	0.1	0.3	-	
Arenaria macrophylla	-	-	<.1	-	-	-	-	-	
Calamagrostis rubescens	0.2	.3	2.4	1.0	1.1	2.8	2.9	2.2	
Carex concinnoides	-	-	-	.1	-	-	-	.3	
Carex geyeri	-	-	-	-	-	-	-	.2	
Carex rossii	-	-	.3	.5	.3	.6	.9	.5	
Clintonia uniflora	.1	-	-	-	-	-	-	-	
Coptis occidentalis	.4	-	-	-	-	-	-	-	
Epilobium angustifolium	-	.1	.8	2.2	3.2	2.4	3.4	2.2	
Hieracium albiflorum	<.1	-	-	-	-	-	-	-	
Pteridium aquilinum	-	-	.6	-	.3	-	.8	-	
Xerophyllum tenax	8.6	1.3	2.6	2.6	3.0	3.1	3.5	4.7	
Misc. herbs	1.3	.7	1.4	1.7	1.4	.9	.7	.3	
Total herbs	10.6	2.5	8.6	8.9	9.9	9.8	12.5	10.4	

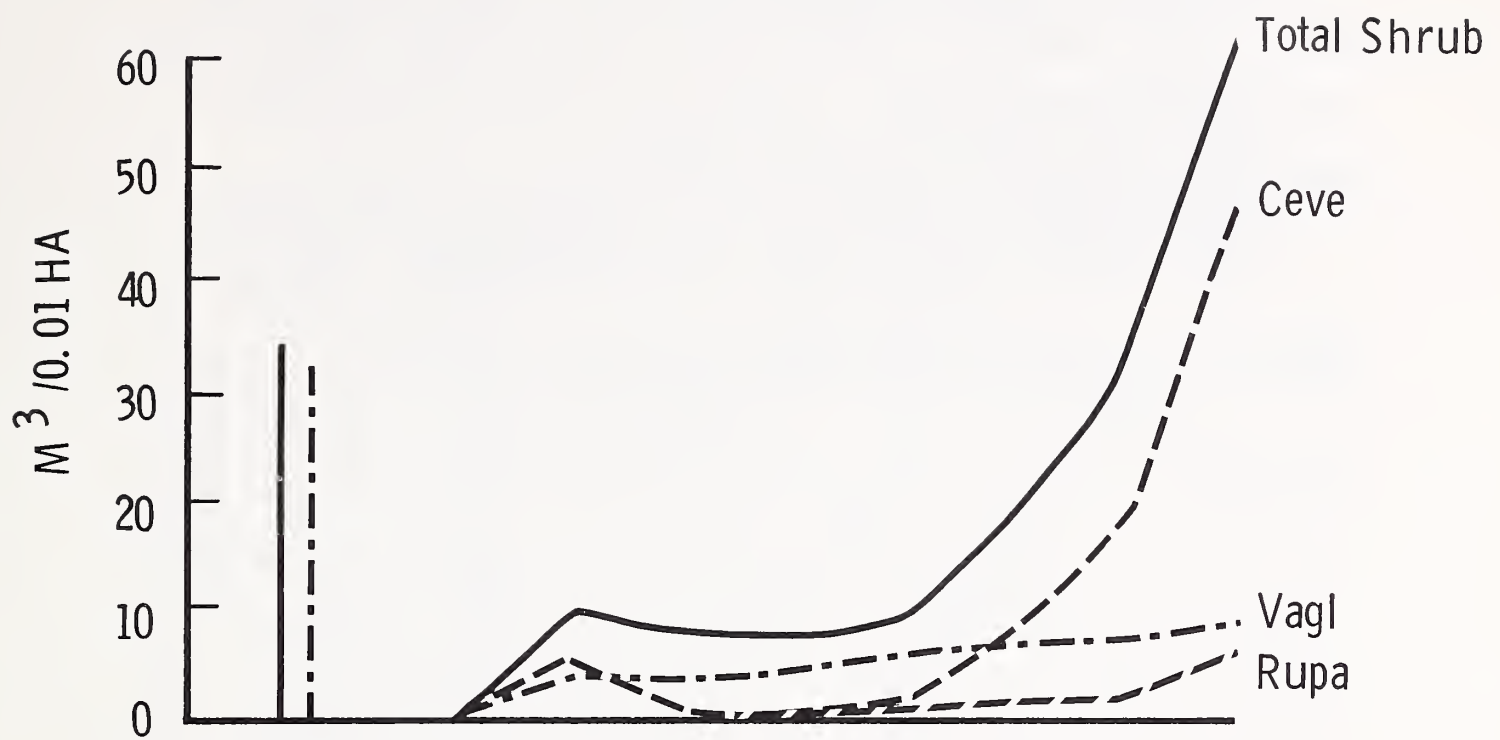


Figure 14-5. Shrub volume.



Figure 14-6. Herb volume.

NEWMAN RIDGE: South-3 (1802-13 Area 28)

Site location and description: SE $\frac{1}{4}$ NE $\frac{1}{4}$ Sec. 34, T18N R29W MPM.

Elevation: 5,200 ft; Exposure: South (Az. 166°); Slope: 50%

Habitat type: *Pseudotsuga menziesii*/*Vaccinium globulare*, *Xerophyllum tenax* Phase

Predisturbance forest stand: Pico 55%, Laoc 27%, Pimo 10%, Psme 7%
(Stand basal area: 4,863 cm²/0.01 ha)

Disturbance treatment: Logged June 1969; Slashed June 1969;

Broadcast-burned: September 15, 1970 (Succession year 1:1971)

Fire intensity: 1,976 g water loss; Duff moisture: Upper --%,
Lower --%; Postfire duff depth: 0.3 cm (8% of preburn depth)

Table 15-1.--Successional development of vegetative cover
(m²/0.01 ha or %), fig. 15-1.

Life-form component	Succession year						
	Pre	1**	2*	3	4	5	6
Tree	-	-		-	-	-	-
Shrub	74	14		23	47	57	62
Herb	47	15		26	42	36	38
Total veg.	122	29		49	89	93	10
Exposed ground surface:							
Bare ground	-	49		22	3	8	1
Rock	-	3		12	2	5	4
Litter	30	19		18	10	15	17
Moss	-	-		2	3	6	11

Table 15-2.--Successional development of vegetative volume
(m³/0.01 ha), fig. 15-2.

Life-form component	Succession year						
	Pre	1**	2*	3	4	5	6
Tree	-	-		-	-	-	-
Shrub	41.2	1.2		6.1	17.6	25.2	31.7
Herb	8.4	4.7		5.8	10.4	7.3	7.8
Total veg.	49.6	5.9		11.9	28.0	32.6	39.5

*No data taken.

**T-2 80% destroyed by bulldozer fire line construction; data adjusted on basis of 6 out of 10 sample blocks receiving clearcut and broadcast burn treatment. T-2 relocated to adjacent site within treated area for SY-3 and all subsequent years.

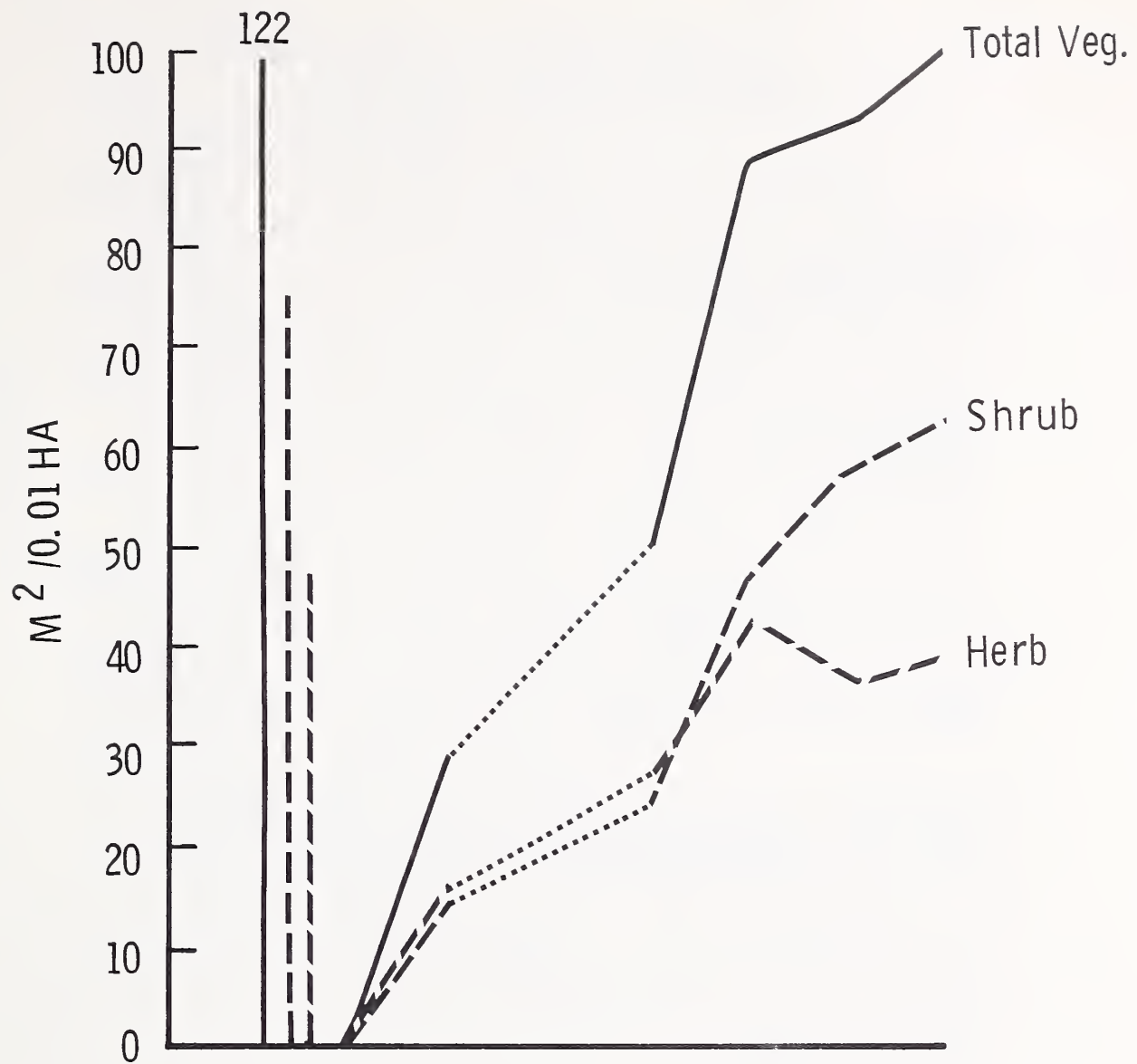


Figure 15-1. Vegetative cover.

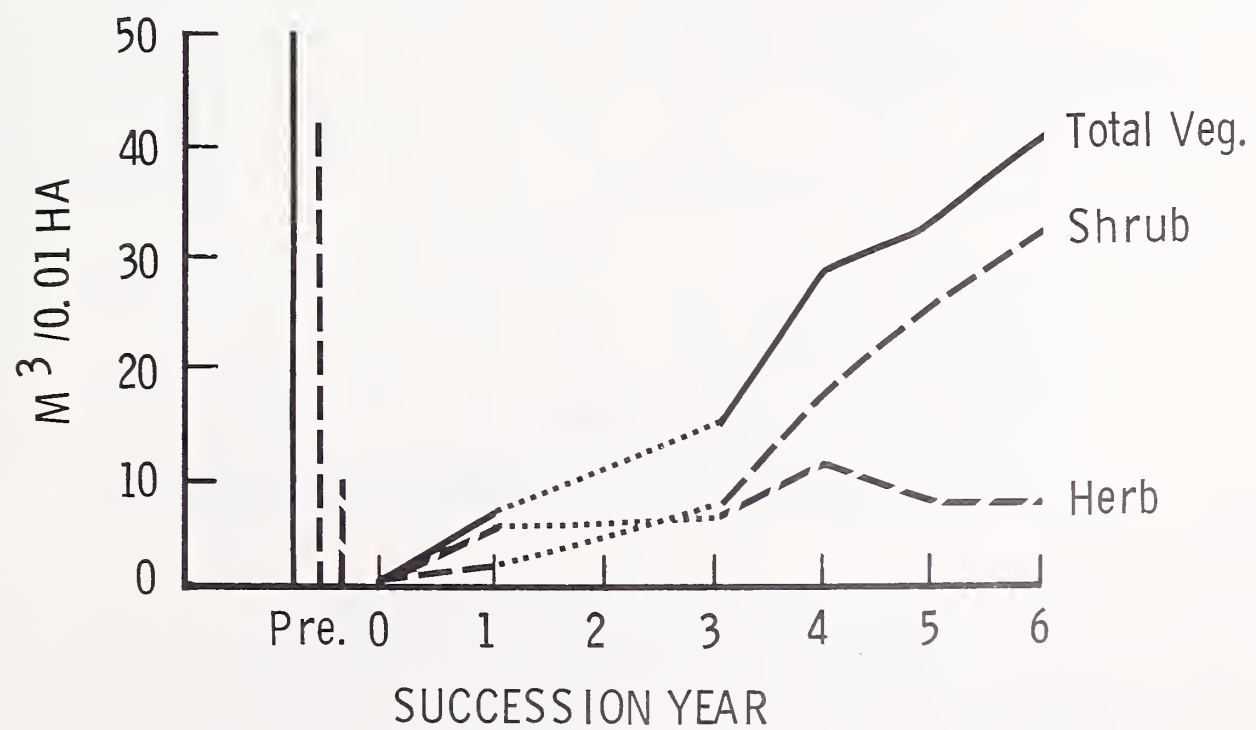


Figure 15-2. Vegetative volume.

NR: S-3 (A-28)

Table 15-3.--Cover development of shrub component
(m²/0.01 ha or %), fig. 15-3.

Species	Succession year						
	Pre	1**	2*	3	4	5	6
<i>Amelanchier alnifolia</i>	<1	-		-	-	-	-
<i>Ceanothus velutinus</i>	-	11		6	25	32	41
<i>Rosa gymnocarpa</i>	11	-		4	2	6	3
<i>Rubus parviflorus</i>	3	-		-	-	-	-
<i>Spiraea betulifolia</i>	2	3		13	19	16	14
<i>Vaccinium globulare</i>	57	-		1	1	3	3
Total shrubs	74	14		23	47	57	62

Table 15-4.--Cover development of herb component
(m²/0.01 ha or %), fig. 15-4.

Species	Succession year						
	Pre	1**	2*	3	4	5	6
<i>Anemone piperi</i>	-	-		-	-	2	1
<i>Arenaria macrophylla</i>	-	1		-	1	-	-
<i>Berberis repens</i>	1	1		2	2	2	2
<i>Calamagrostis rubescens</i>	12	4		9	18	13	16
<i>Carex rossii</i>	-	-		2	4	2	6
<i>Epilobium angustifolium</i>	-	-		1	1	1	-
<i>Epilobium paniculatum</i>	-	-		2	3	-	-
<i>Xerophyllum tenax</i>	19	3		6	7	9	9
Misc. herbs	16	6		5	5	7	5
Total herbs	47	15		26	42	36	38

*No data taken.

**T-2 80% destroyed by bulldozer fire line construction; data adjusted on basis of 6 out of 10 sample blocks receiving clearcut and broadcast burn treatment. T-2 relocated to adjacent site within treated area for SY=3 and all subsequent years.

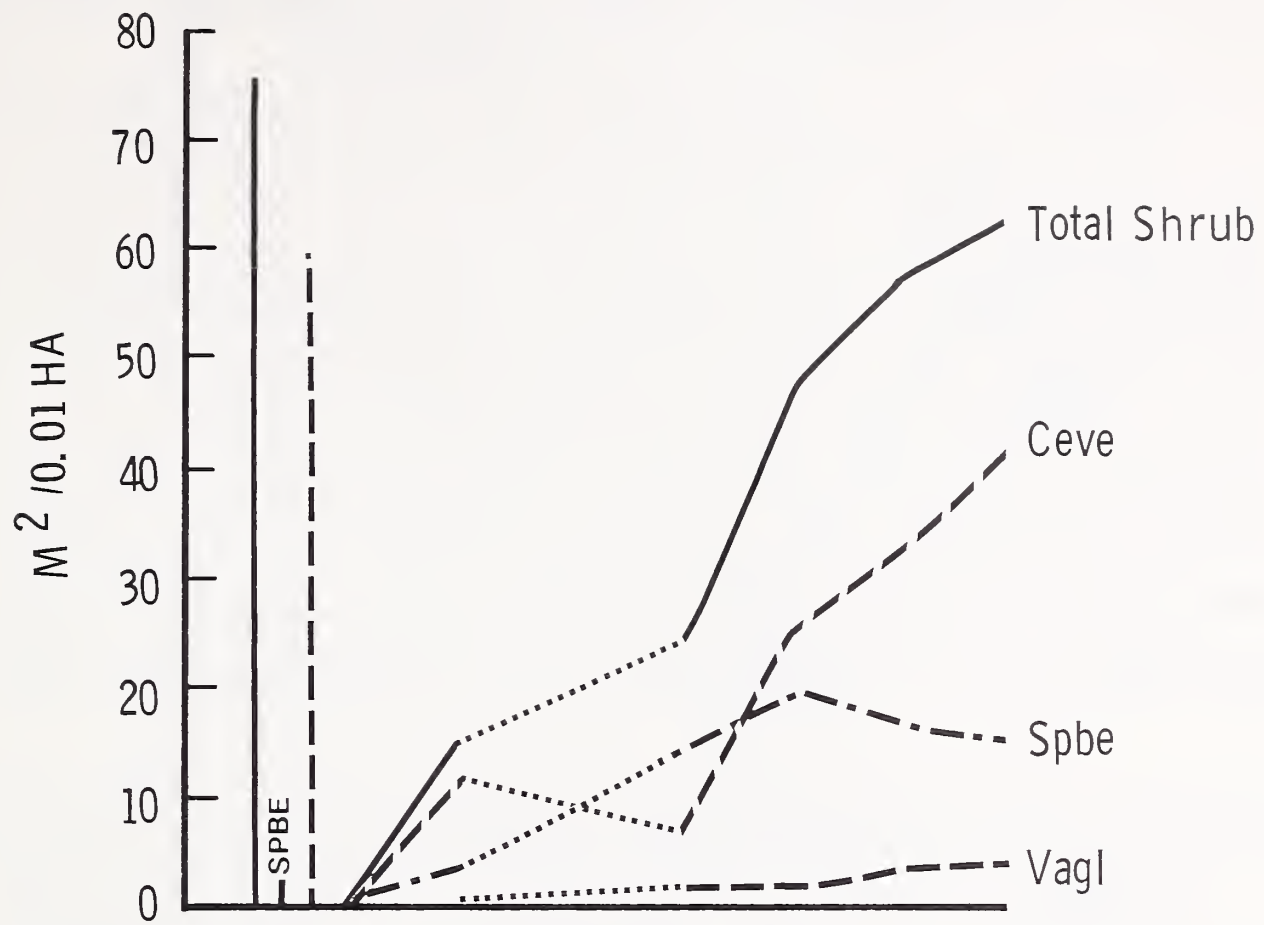


Figure 15-3. Shrub cover.

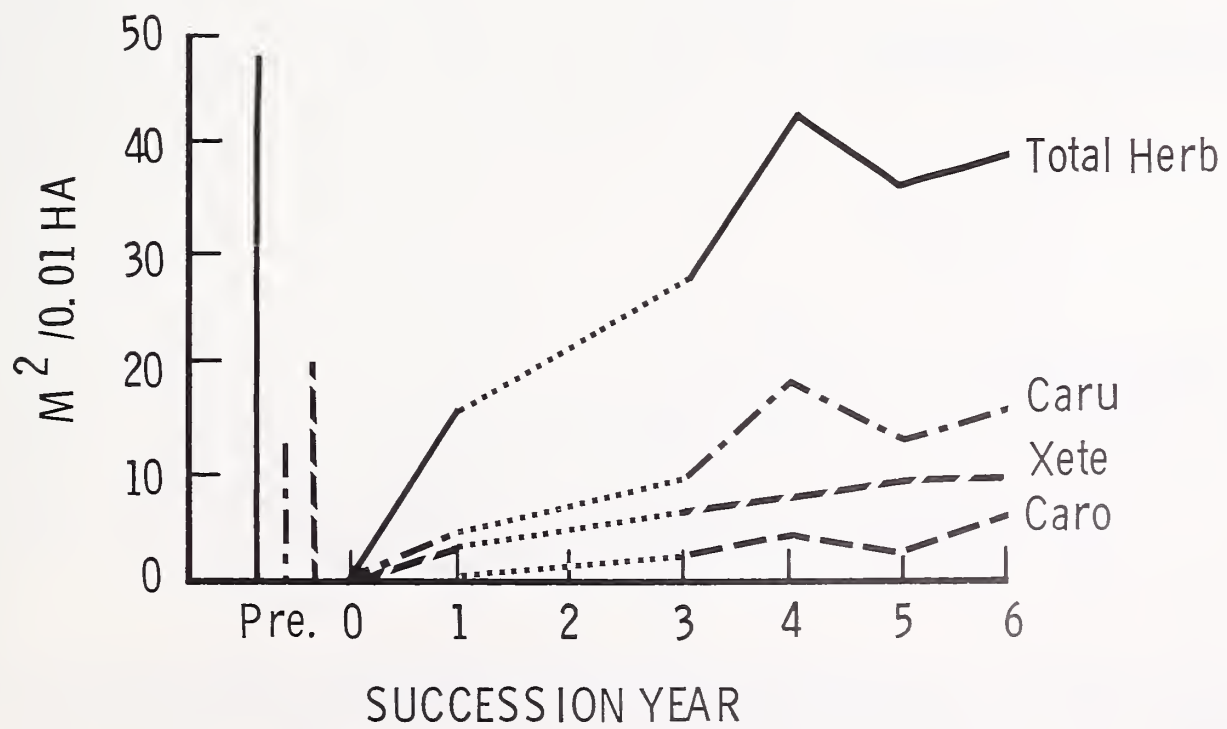


Figure 15-4. Herb cover.

Table 15-5.--Volume development of shrub component ($m^3/0.01$ ha), fig. 15-5.

Species	Succession year						
	Pre	1**	2*	3	4	5	6
<i>Amelanchier alnifolia</i>	0.1	-	-	-	-	-	-
<i>Ceanothus velutinus</i>	-	0.6	1.2	10.4	18.0	26.4	
<i>Rosa gymnocarpa</i>	7.1	-	1.3	1.4	2.3	.8	
<i>Rubus parviflorus</i>	1.0	-	-	-	-	-	
<i>Spiraea betulifolia</i>	.7	.6	3.5	5.7	4.4	4.0	
<i>Vaccinium globulare</i>	32.6	-	.1	.1	.4	.5	
Total shrubs	41.2	1.2	6.1	17.6	25.2	31.7	

Table 15-6.--Volume development of herb component ($m^3/0.01$ ha), fig. 15-6.

Species	Succession year						
	Pre	1**	2*	3	4	5	6
<i>Anemone piperi</i>	-	-	-	-	0.2	0.1	
<i>Arenaria macrophylla</i>	-	0.1	-	<0.1	-	-	
<i>Berberis repens</i>	0.1	.2	0.3	.5	.2	.3	
<i>Calamagrostis rubescens</i>	1.1	3.0	2.4	5.9	3.0	4.0	
<i>Carex rossii</i>	-	-	.2	.6	.4	.8	
<i>Epilobium angustifolium</i>	-	-	.3	.4	.6	-	
<i>Epilobium paniculatum</i>	-	-	.6	.8	-	-	
<i>Xerophyllum tenax</i>	5.1	.3	1.0	1.4	1.8	1.9	
Misc. herbs	2.0	1.2	.9	.8	1.1	.8	
Total herbs	8.4	4.7	5.8	10.4	7.3	7.8	

*No data taken.

**T-2 80% destroyed by bulldozer fire line construction; data adjusted on basis of 6 out of 10 sample blocks receiving clearcut and broadcast burn treatment. T-2 relocated to adjacent site within treated area for SY-3 and all subsequent years.

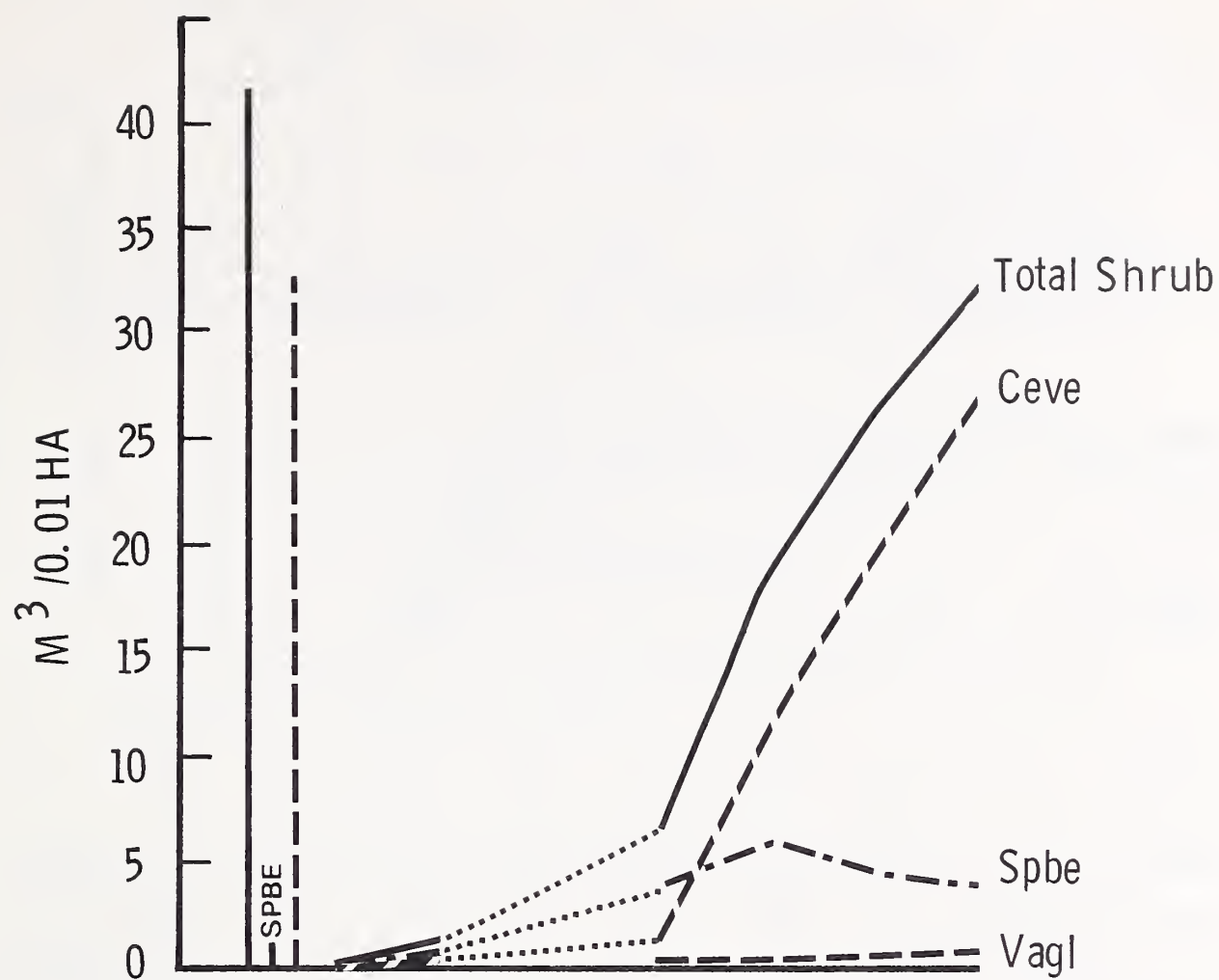


Figure 15-5. Shrub volume.

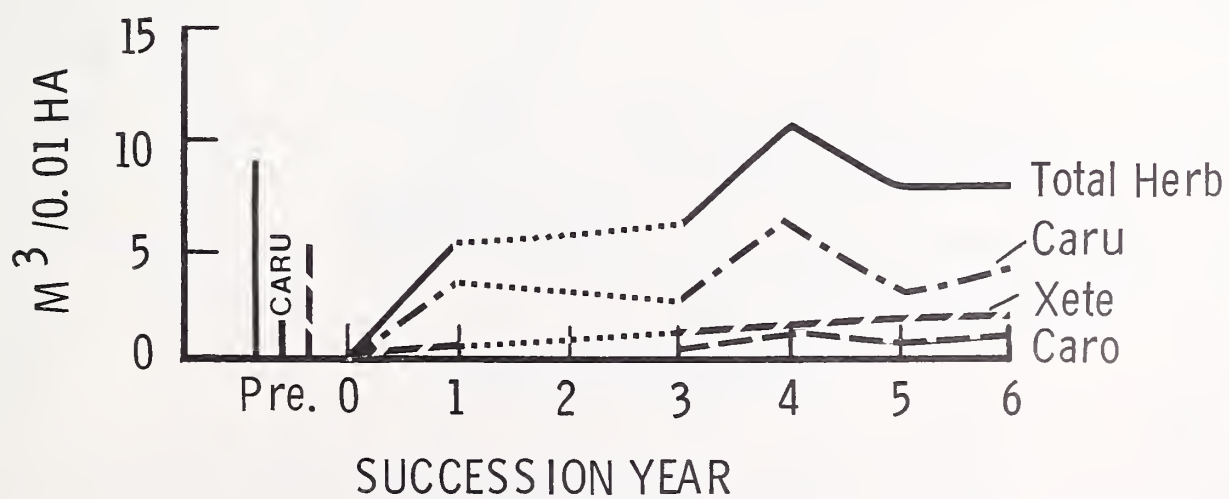


Figure 15-6. Herb volume.

NEWMAN RIDGE: West-2 (1802-13 Area 25)

Site location and description: NW $\frac{1}{4}$ SW $\frac{1}{4}$ Sec. 25, T18N R29W MPM.

Elevation 4,900 ft; Exposure: West; Slope: 55%

Habitat type: *Abies grandis*/*Clintonia uniflora*, *Xerophyllum tenax* Phase

Predisturbance forest stand: Abgr 74%, Pico 23%, Psme 4%

(Stand basal area: 3,308 cm²/0.01 ha)

Disturbance treatment: Logged September 1968; Slashed November 1968;

Broadcast-burned: July 18, 1969 (Succession year 1:1970)

Fire intensity: 1,253 g water loss; Duff moisture: Upper 20%,

Lower 40%; Postfire duff depth: 2.2 cm (41% of preburn depth)

Table 16-1.--Successional development of vegetative cover
(m²/0.01 ha or %), fig. 16-1.

Life-form component	Succession year									
	Pre	1	2	3	4	5	6	7		
Tree	-	-	-	-	-	-	1	2		
Shrub	49	10	19	19	22	37	47	32		
Herb	44	19	53	44	42	44	45	35		
Total veg.	93	29	72	63	63	81	93	69		

Exposed ground surface:

Bare ground	-	55	8	6	3	2	5	2		
Rock	-	-	-	-	-	-	-	-		
Litter	36	16	8	8	10	4	4	8		
Moss	1	-	17	23	26	17	14	32		

Table 16-2.--Successional development of vegetative volume
(m³/0.01 ha), fig. 16-2.

Life-form component	Succession year									
	Pre	1	2	3	4	5	6	7		
Tree	-	-	-	-	-	-	0.3	1.9		
Shrub	27.9	1.7	6.0	5.1	5.9	11.1	19.6	14.0		
Herb	5.5	4.0	17.1	14.2	18.0	17.6	13.1	10.4		
Total veg.	33.3	5.7	23.0	19.3	23.9	28.7	33.0	26.3		

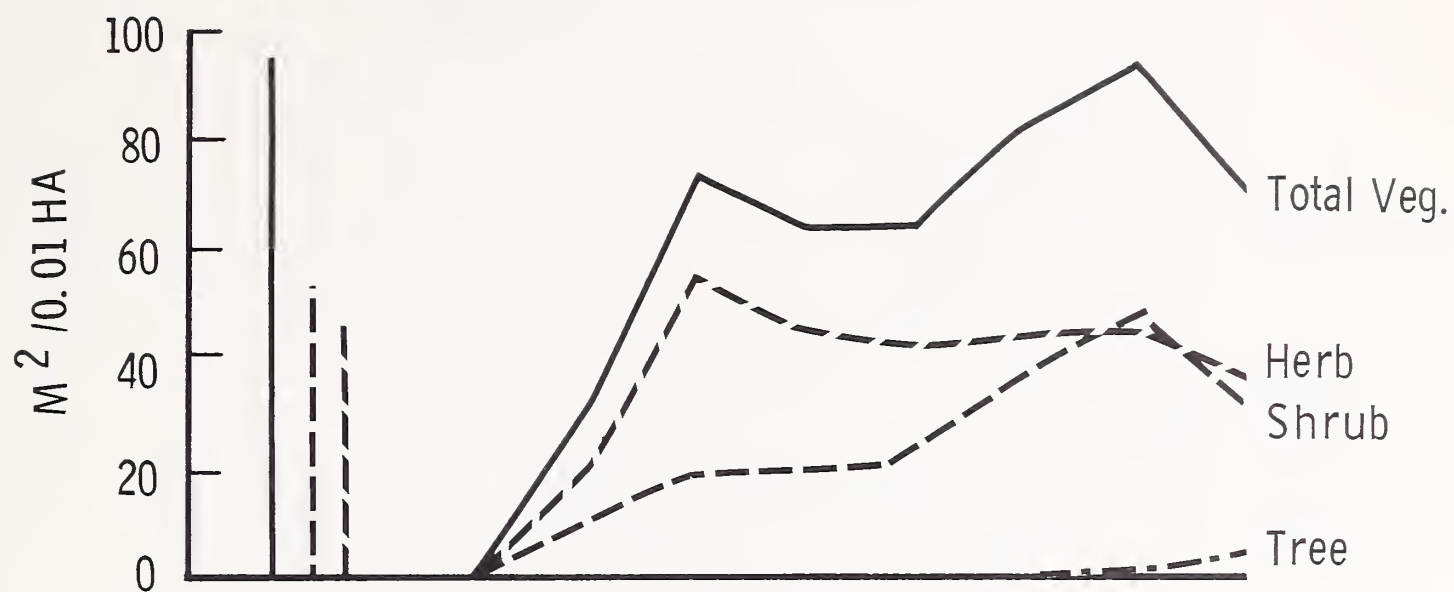


Figure 16-1. Vegetative cover.

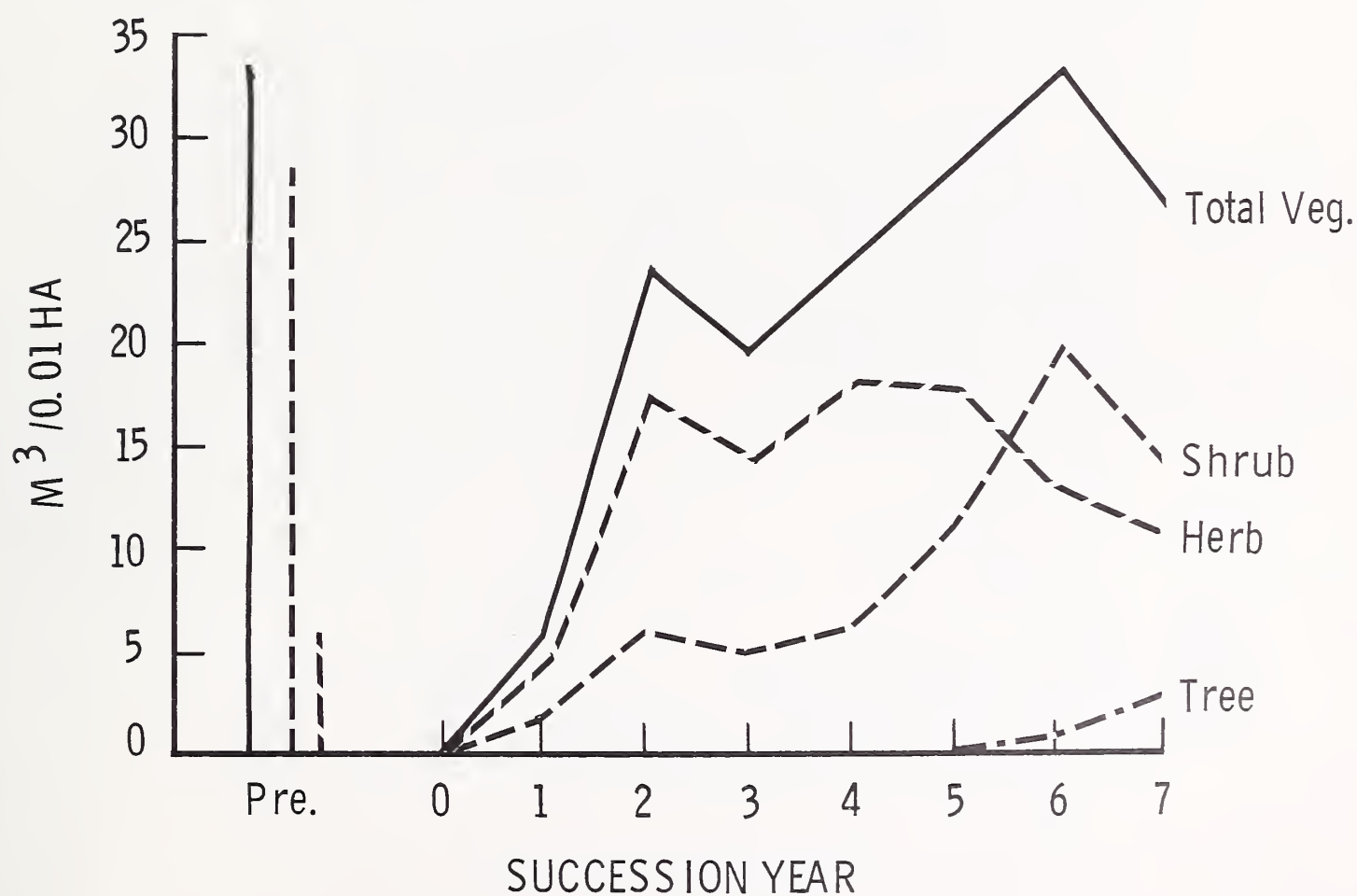


Figure 16-2. Vegetative volume.

NR: W-2 (A-25)

Table 16-3.--Cover development of shrub component
(m²/0.01 ha or %), fig. 16-3.

(m / 0.01 ha or %), fig. 10-5.

Species	Succession year							
	Pre	1	2	3	4	5	6	7
<i>Ceanothus sanguineus</i>	-	1	1	2	2	2	-	-
<i>Pachistima myrsinites</i>	<1	-	-	-	-	1	-	-
<i>Ribes viscosissimum</i>	-	-	1	-	1	2	2	2
<i>Rosa gymnocarpa</i>	2	-	-	-	-	1	1	<1
<i>Salix scouleriana</i>	-	-	-	<1	2	3	6	6
<i>Spiraea betulifolia</i>	5	8	13	9	8	16	21	12
<i>Vaccinium globulare</i>	42	2	4	8	9	12	17	12
Total shrubs	49	10	19	19	22	37	47	32

Table 16-4.--Cover development of herb component
(m²/0.01 ha or %), fig. 16-4.

Species	Succession year							
	Pre	1	2	3	4	5	6	7
Adenocaulon bicolor	1	-	-	-	-	-	-	-
Anemone piperi	1	-	4	8	3	1	2	-
Calamagrostis rubescens	1	-	-	1	2	6	6	6
Carex concinnoides	-	-	-	2	2	3	4	7
Carex rossii	-	-	4	6	5	5	8	5
Clintonia uniflora	2	-	-	-	-	-	-	-
Coptis occidentalis	18	-	1	1	1	-	-	1
Epilobium angustifolium	-	12	22	17	20	23	15	9
Epilobium paniculatum	-	-	14	-	-	-	-	-
Epilobium watsonii	-	-	1	-	-	-	-	-
Thalictrum occidentale	1	-	-	-	-	-	-	-
Trillium ovatum	-	-	-	-	-	-	1	-
Xerophyllum tenax	10	-	-	1	1	-	1	1
Misc. herbs	11	8	8	9	8	6	8	7
Total herbs	44	19	53	44	42	44	45	35

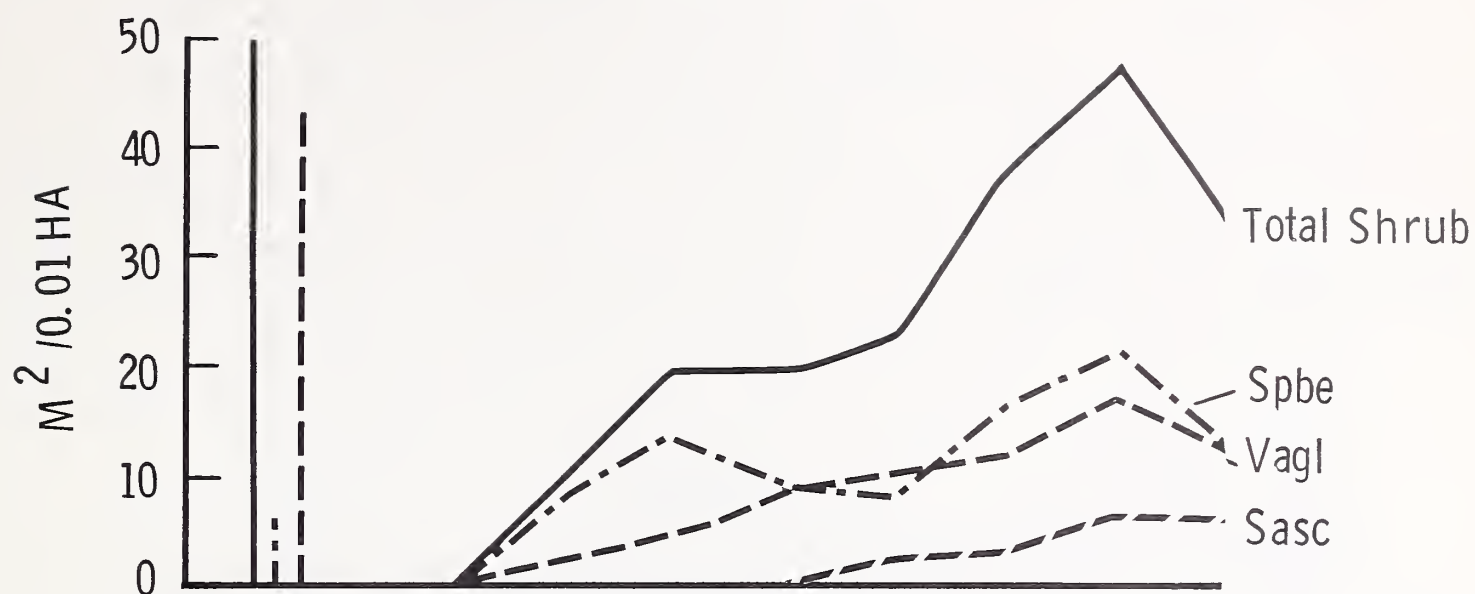


Figure 16-3. Shrub cover.

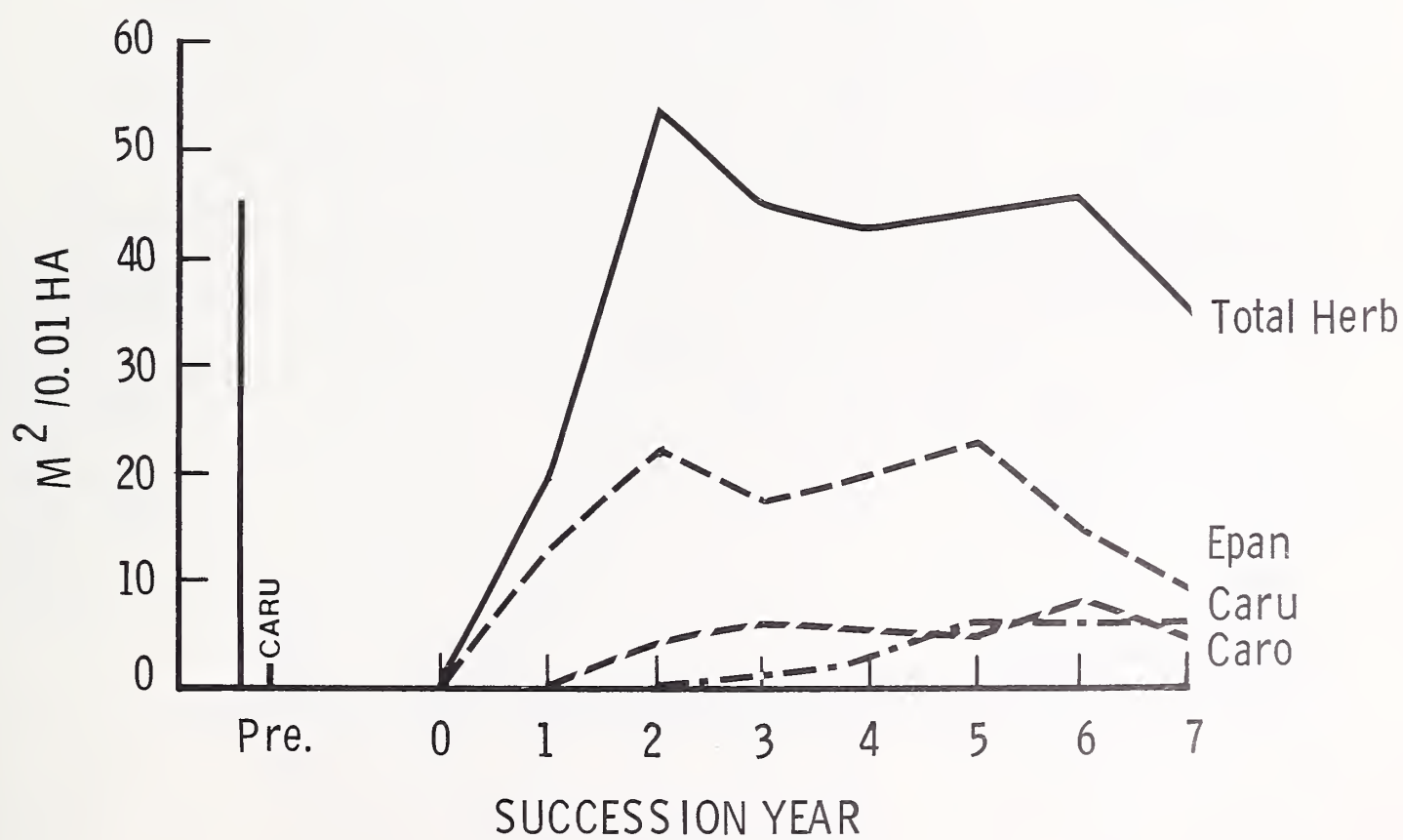


Figure 16-4. Herb cover.

Table 16-5.--Volume development of shrub component (m³/0.01 ha), fig. 16-5.

Species	Succession year								
	Pre	1	2	3	4	5	6	7	
Ceanothus sanguineus	-	0.1	0.1	0.3	0.3	0.3	-	-	
Pachistima myrsinites	0.1	-	-	-	-	.1	-	-	
Ribes viscosissimum	-	-	.1	-	.4	.8	1.4	1.6	
Rosa gymnocarpa	1.1	-	-	-	-	.2	.4	.1	
Salix scouleriana	-	-	-	.2	1.6	2.8	5.9	7.0	
Spiraea betulifolia	1.2	1.4	5.0	3.0	2.2	4.5	8.0	2.9	
Vaccinium globulare	25.4	.2	.7	1.6	1.4	2.4	4.0	2.5	
Total shrubs	27.9	1.7	6.0	5.1	5.9	11.1	19.6	14.0	

Table 16-6.--Volume development of herb component (m³/0.01 ha), fig. 16-6.

Species	Succession year								
	Pre	1	2	3	4	5	6	7	
Adenocaulon bicolor	0.2	-	-	-	-	-	-	-	
Anemone piperi	.1	-	0.4	1.9	0.4	0.1	0.2	-	
Calamagrostis rubescens	.1	-	-	.2	.4	1.3	1.6	2.2	
Carex concinnoides	-	-	-	.2	.2	.3	.4	.8	
Carex rossii	-	-	.6	.8	.6	.8	1.1	.8	
Clintonia uniflora	.1	-	-	-	-	-	-	-	
Coptis occidentalis	1.7	-	.1	<.1	.1	-	-	<.1	
Epilobium angustifolium	-	3.4	11.2	9.7	15.0	14.4	8.3	5.2	
Epilobium paniculatum	-	-	3.6	-	-	-	-	-	
Epilobium watsonii	-	-	<.1	-	-	-	-	-	
Thalictrum occidentale	.2	-	-	-	-	-	-	-	
Trillium ovatum	-	-	-	-	-	-	.1	-	
Xerophyllum tenax	2.0	-	-	.1	.1	-	.1	.1	
Misc. herbs	1.1	.6	1.2	1.5	1.2	.7	1.3	1.2	
Total herbs	5.5	4.0	17.1	14.2	18.0	17.6	13.1	10.4	

NR: W-2 (A-25)

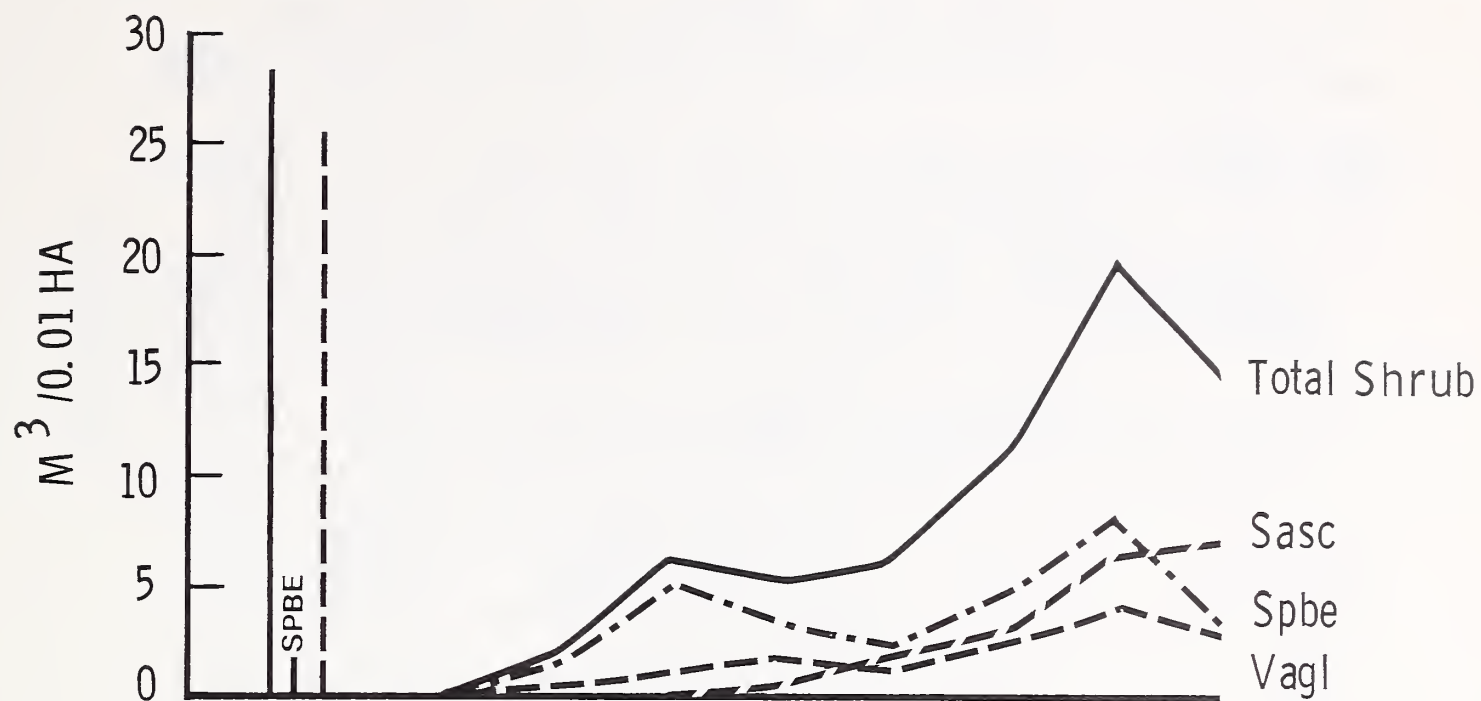


Figure 16-5. Shrub volume.

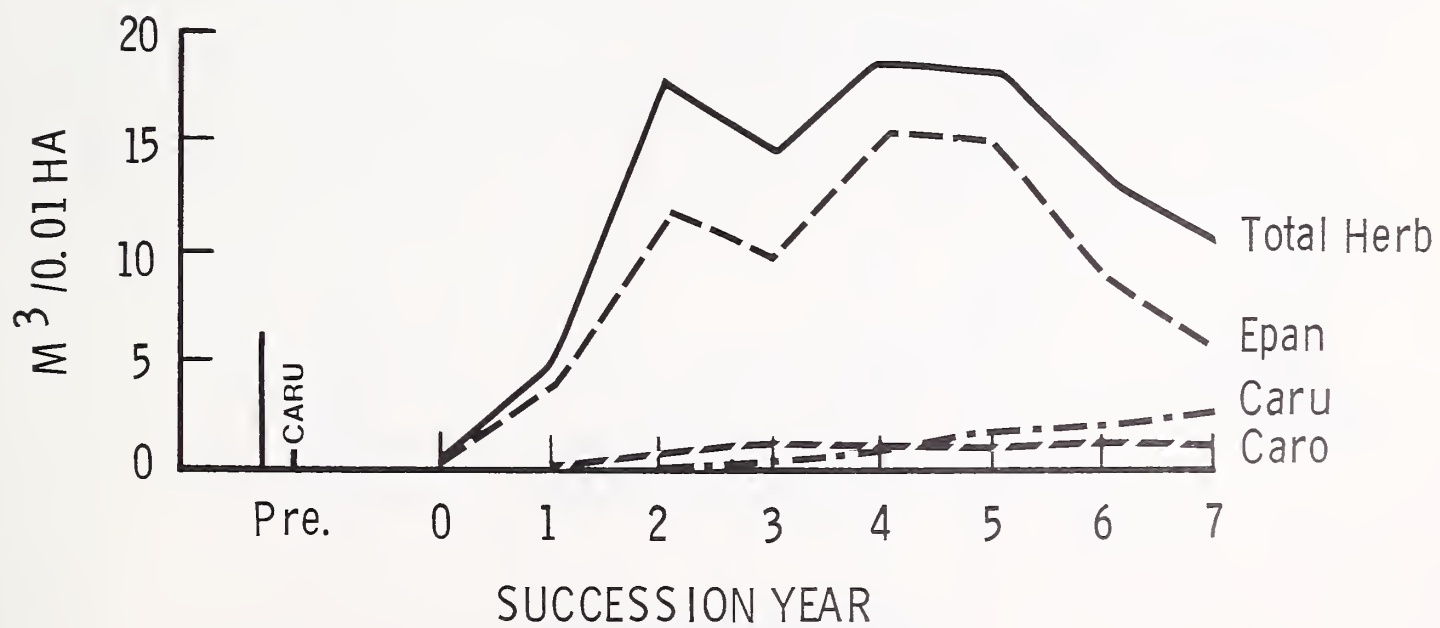


Figure 16-6. Herb volume.

NEWMAN RIDGE: West-3 (1802-13 Area 29)

Site location and description: SW $\frac{1}{4}$ SW $\frac{1}{4}$ Sec. 26, T18N R29W MPM.

Elevation: 5,100 ft; Exposure: West (Az. 276°); Slope: 45%

Habitat type: *Abies grandis*/*Clintonia uniflora*, *Xerophyllum*

tenax Phase

Predisturbance forest stand: Pico 35%, Psme 28%, Laoc 20%, Pimo 10%,

Abla 7% (Stand basal area: 3,390 cm²/0.01 ha)

Disturbance treatment: Logged November 1968; Slashed June 1969;

Broadcast-burned: September 28, 1970 (Succession year 1:1971)

Fire intensity: 283 g water loss; Duff moisture: Upper --%,

Lower --%; Postfire duff depth: 1.0 cm (27% of preburn depth)

Table 17-1.--Successional development of vegetative cover
(m²/0.01 ha or %), fig. 17-1.

Life-form component	Succession year						
	Pre	1	2*	3	4	5	6
Tree	2	-	-	-	-	-	-
Shrub	54	7	19	37	44	51	
Herb	42	10	27	36	35	31	
Total veg.	98	17	46	73	79	82	
Exposed ground surface:							
Bare ground	-	35	17	5	5	5	
Rock	-	3	4	1	2	3	
Litter	39	43	32	17	7	11	
Moss	-	1	1	6	11	12	

Table 17-2.--Successional development of vegetative volume
(m³/0.01 ha), fig. 17-2.

Life-form component	Succession year						
	Pre	1	2*	3	4	5	6
Tree	0.7	-	-	-	-	-	-
Shrub	29.8	1.1	3.2	8.6	12.0	18.9	
Herb	8.0	1.5	5.5	7.2	6.8	6.3	
Total veg.	38.5	2.6	8.7	15.8	18.8	25.2	

* No data taken.

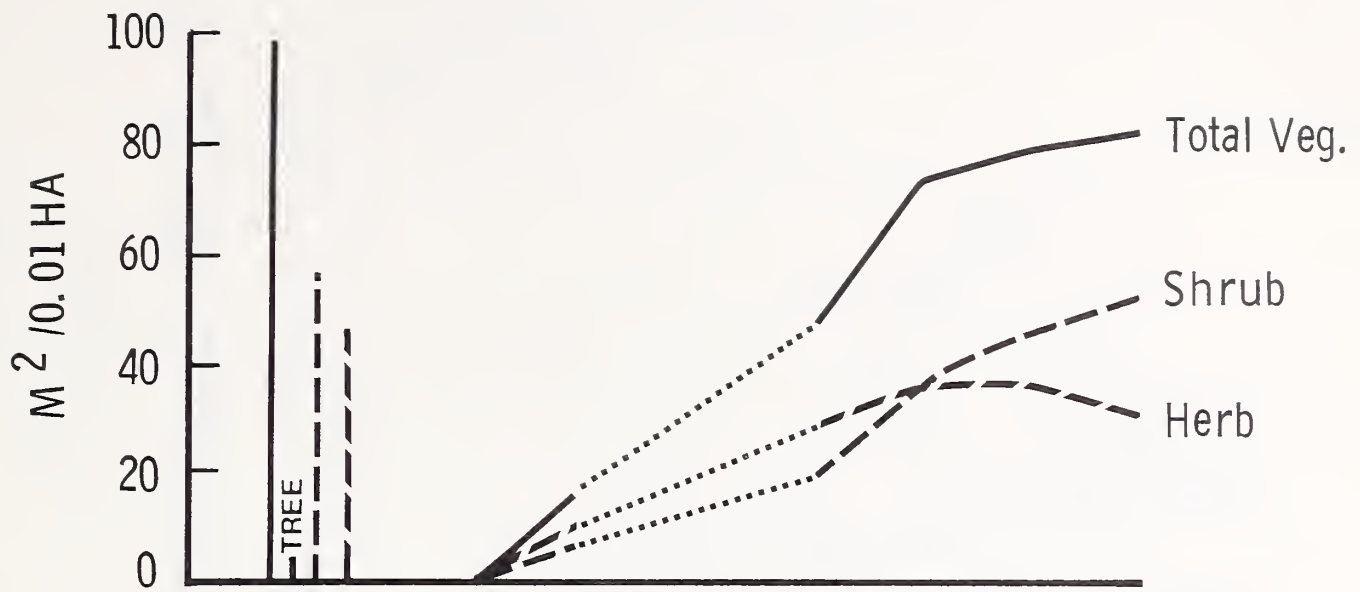


Figure 17-1. Vegetative cover.

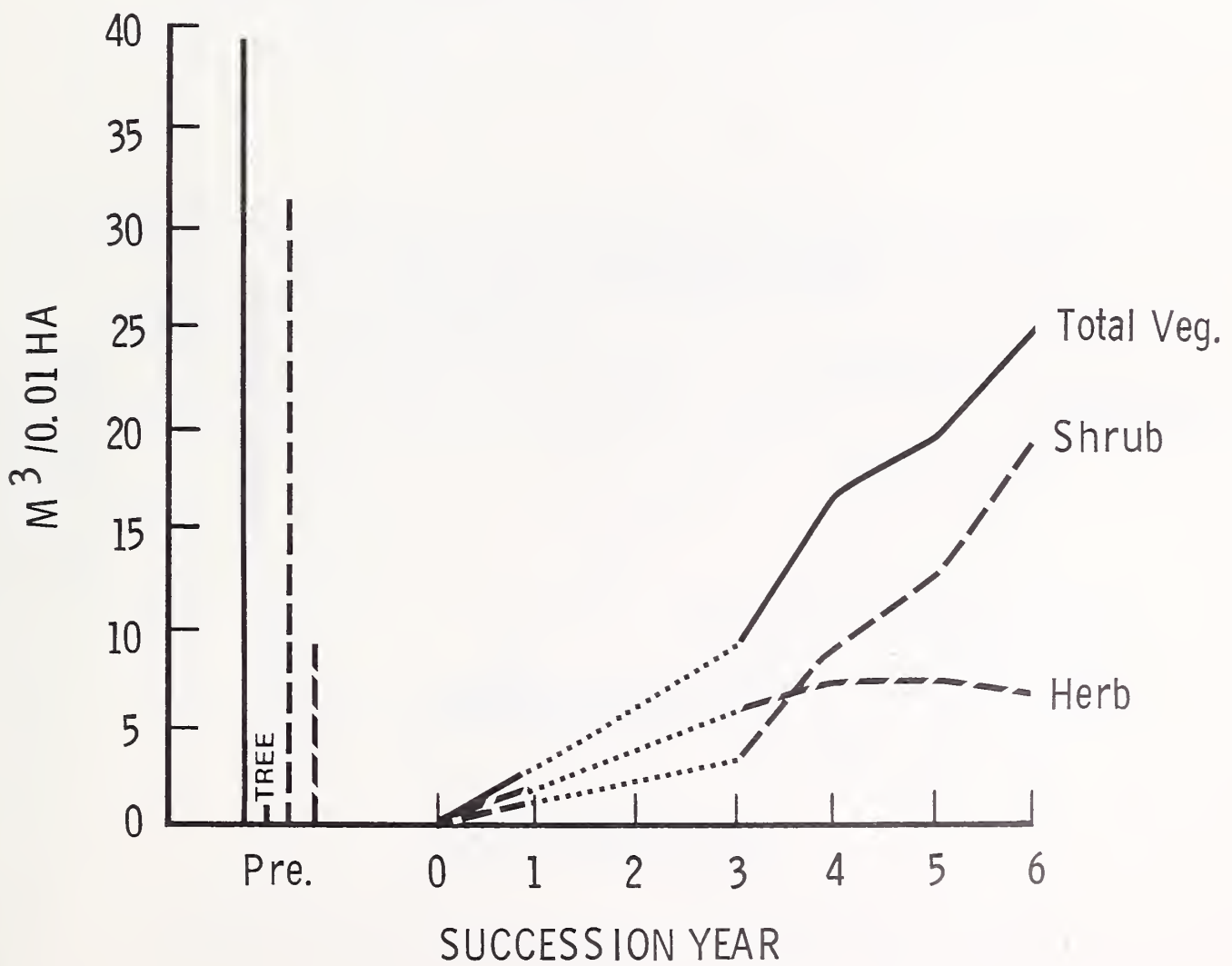


Figure 17-2. Vegetative volume.

Table 17-3.--Cover development of shrub component
(m²/0.01 ha or %), fig. 17-3.

Species	Succession year						
	Pre :	1 :	2*:	3 :	4 :	5 :	6
<i>Acer glabrum</i>	4	-	-	1	2	2	
<i>Amelanchier alnifolia</i>	3	-	-	-	-	-	
<i>Ceanothus velutinus</i>	-	3	7	13	15	24	
<i>Lonicera utahensis</i>	1	-	-	-	1	1	
<i>Ribes viscosissimum</i>	-	-	-	1	2	2	
<i>Rosa gymnocarpa</i>	2	-	-	-	-	-	
<i>Spiraea betulifolia</i>	1	4	11	17	18	16	
<i>Vaccinium globulare</i>	44	-	2	5	7	7	
Total shrubs	54	7	19	37	44	51	

Table 17-4.--Cover development of herb component
(m²/0.01 ha or %), fig. 17-4.

Species	Succession year						
	Pre :	1 :	2*:	3 :	4 :	5 :	6
<i>Anemone piperi</i>	-	-	-	-	1	-	
<i>Berberis repens</i>	-	-	1	1	-	2	
<i>Calamagrostis rubescens</i>	1	1	2	11	10	8	
<i>Calamagrostis tweedyi</i>	-	1	2	5	4	3	
<i>Carex concinnoides</i>	-	-	-	-	-	1	
<i>Carex rossii</i>	-	-	6	8	9	8	
<i>Epilobium paniculatum</i>	-	-	2	1	-	-	
<i>Xerophyllum tenax</i>	32	3	4	3	7	5	
Misc. herbs	9	5	10	7	4	2	
Total herbs	42	10	27	36	35	31	

*No data taken.

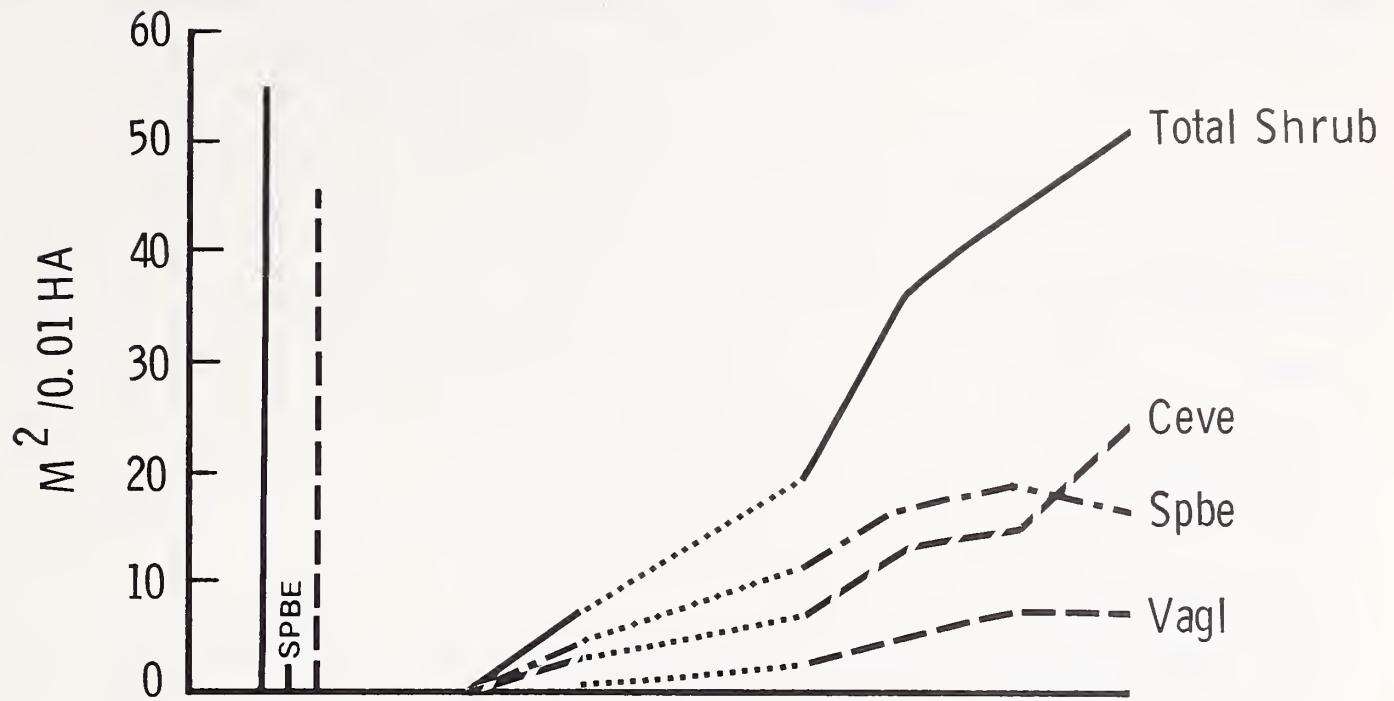


Figure 17-3. Shrub cover.

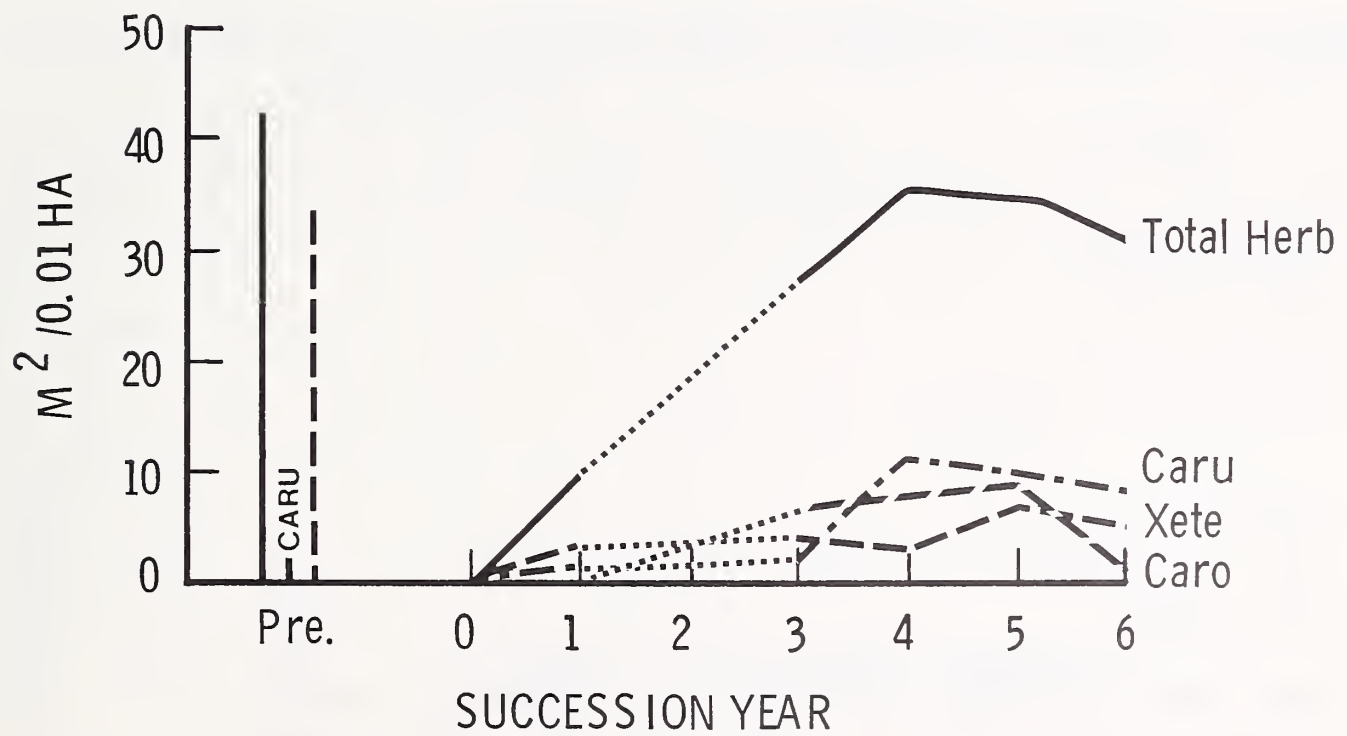


Figure 17-4. Herb cover.

NR: W-3 (A-29)

Table 17-5.--Volume development of shrub component ($m^3/0.01$ ha), fig. 17-5.

Species	Succession year						
	Pre	1	2*	3	4	5	6
<i>Acer glabrum</i>	3.9	-	-	0.5	1.2	1.6	
<i>Amelanchier alnifolia</i>	2.1	-	-	-	-	-	
<i>Ceanothus velutinus</i>	-	0.2	0.5	2.0	3.0	10.7	
<i>Lonicera utahensis</i>	.5	-	-	-	.5	.4	
<i>Ribes viscosissimum</i>	-	-	-	.4	.7	.8	
<i>Rosa gymocarpa</i>	1.6	-	-	-	-	-	
<i>Spiraea betulifolia</i>	.2	1.0	2.5	4.8	5.7	4.2	
<i>Vaccinium globulare</i>	21.6	-	.2	.8	1.0	1.2	
Total shrubs	29.8	1.1	3.2	8.6	12.0	18.9	

Table 17-6.--Volume development of herb component ($m^3/0.01$ ha), fig. 17-6.

Species	Succession year						
	Pre	1	2*	3	4	5	6
<i>Anemone piperi</i>	-	-	-	-	0.1	-	
<i>Berberis repens</i>	-	-	0.1	0.1	-	0.4	
<i>Calamagrostis rubescens</i>	0.2	0.3	.8	3.4	2.4	2.2	
<i>Calamagrostis tweedyi</i>	-	.1	.5	1.1	1.0	.9	
<i>Carex concinnoides</i>	-	-	-	-	-	<.1	
<i>Carex rossii</i>	-	-	.8	1.1	1.3	1.3	
<i>Epilobium paniculatum</i>	-	-	.8	.1	-	-	
<i>Xerophyllum tenax</i>	6.8	.7	.9	.7	1.6	1.2	
Misc. herbs	1.0	.4	1.5	.7	.4	.4	
Total herbs	8.0	1.5	5.5	7.2	6.8	6.3	

*No data taken.

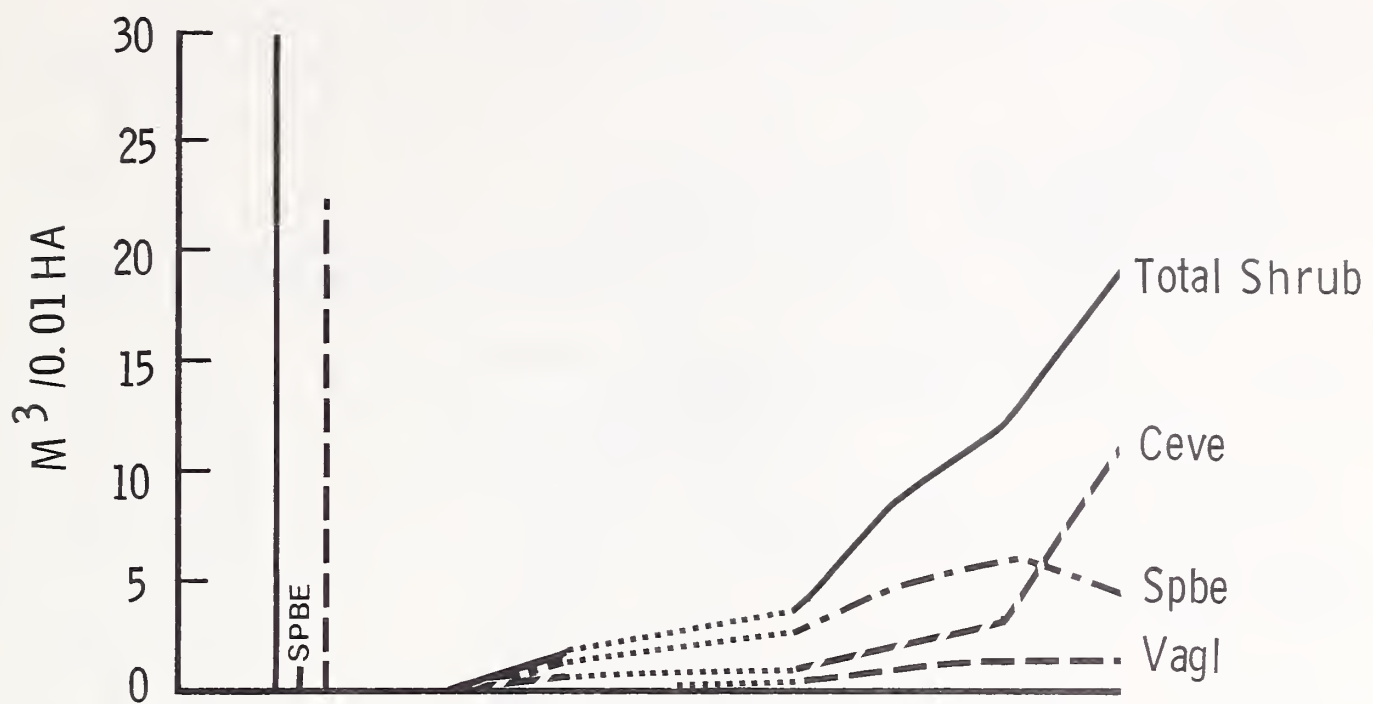


Figure 17-5. Shrub volume.

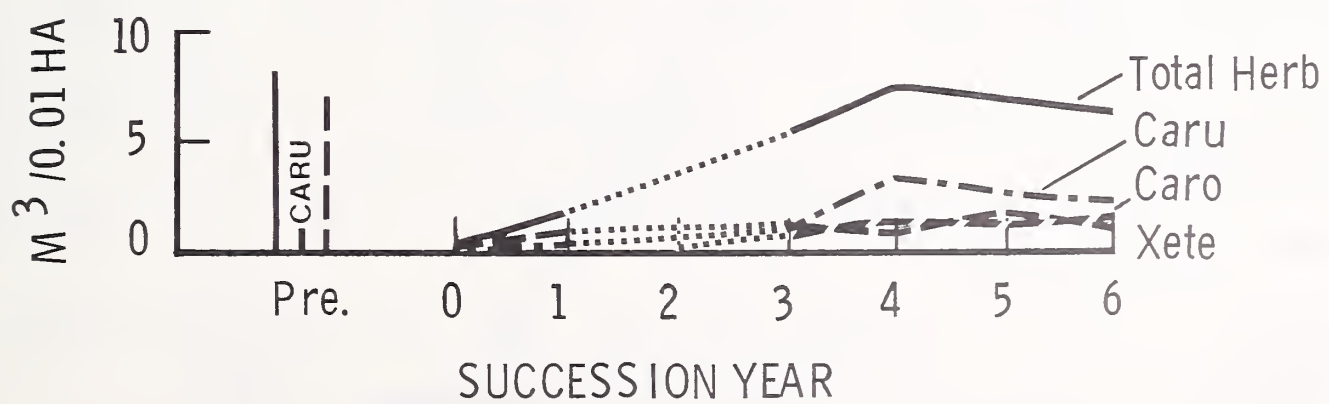


Figure 17-6. Herb volume.

MILLER CREEK: South-12 (1802-13 Area 22-3)

Site location and description: SE $\frac{1}{4}$ NE $\frac{1}{4}$ Sec. 20, T32N R24W MPM.

Elevation: 4,550 ft; Exposure: South (Az. 180°); Slope: 15%

Habitat type: *Abies lasiocarpa*/*Clintonia uniflora*, *Xerophyllum tenax*
Phase

Predisturbance forest stand: Laoc 54%, Psme 24%, Abia 12%, Pien 10%
(Stand basal area: 3,553 cm²/0.01 ha)

Disturbance treatment: Unlogged; Wildfire: August 23, 1967

(Succession year 1:1968); Fire intensity: -- g water loss;

Duff moisture: Upper 24%, Lower 56%; Postfire duff depth: -- cm

Table 18-1.--Successional development of vegetative cover
(m²/0.01 ha or %), fig. 18-1.

Life-form component	Succession year										
	Pre	: 1	: 2	: 3	: 4	: 5	: 6	: 7	: 8	: 9	
Tree	2	-	-	-	-	-	-	-	-	3	
Shrub	73	-	2	8	8	11	22	24	52	54	
Herb	54	15	38	55	40	43	41	35	35	35	
Total veg.	129	15	40	63	48	54	63	59	87	91	
Exposed ground surface:											
Bare ground	-	12	2	-	-	-	-	-	-	-	
Rock	-	-	-	-	-	-	-	-	-	-	
Litter	22	57	47	16	22	21	28	27	22	31	
Moss	2	17	12	27	35	30	23	25	27	21	

Table 18-2.--Successional development of vegetative volume
(m³/0.01 ha), fig. 18-2.

Life-form component	Succession year																		
	Pre	:	1	:	2	:	3	:	4	:	5	:	6	:	7	:	8	:	9
Tree	0.7		-		-		-		-		-		-		-		-		4.0
Shrub	133.0		-		2.2		6.0		6.3		6.9		14.2		15.3		37.8		44.1
Herb	17.9		1.5		14.6		27.4		16.1		20.9		18.3		13.9		13.7		14.4
Total veg.	151.7		1.5		16.7		33.4		22.5		27.8		32.5		29.2		51.4		62.5

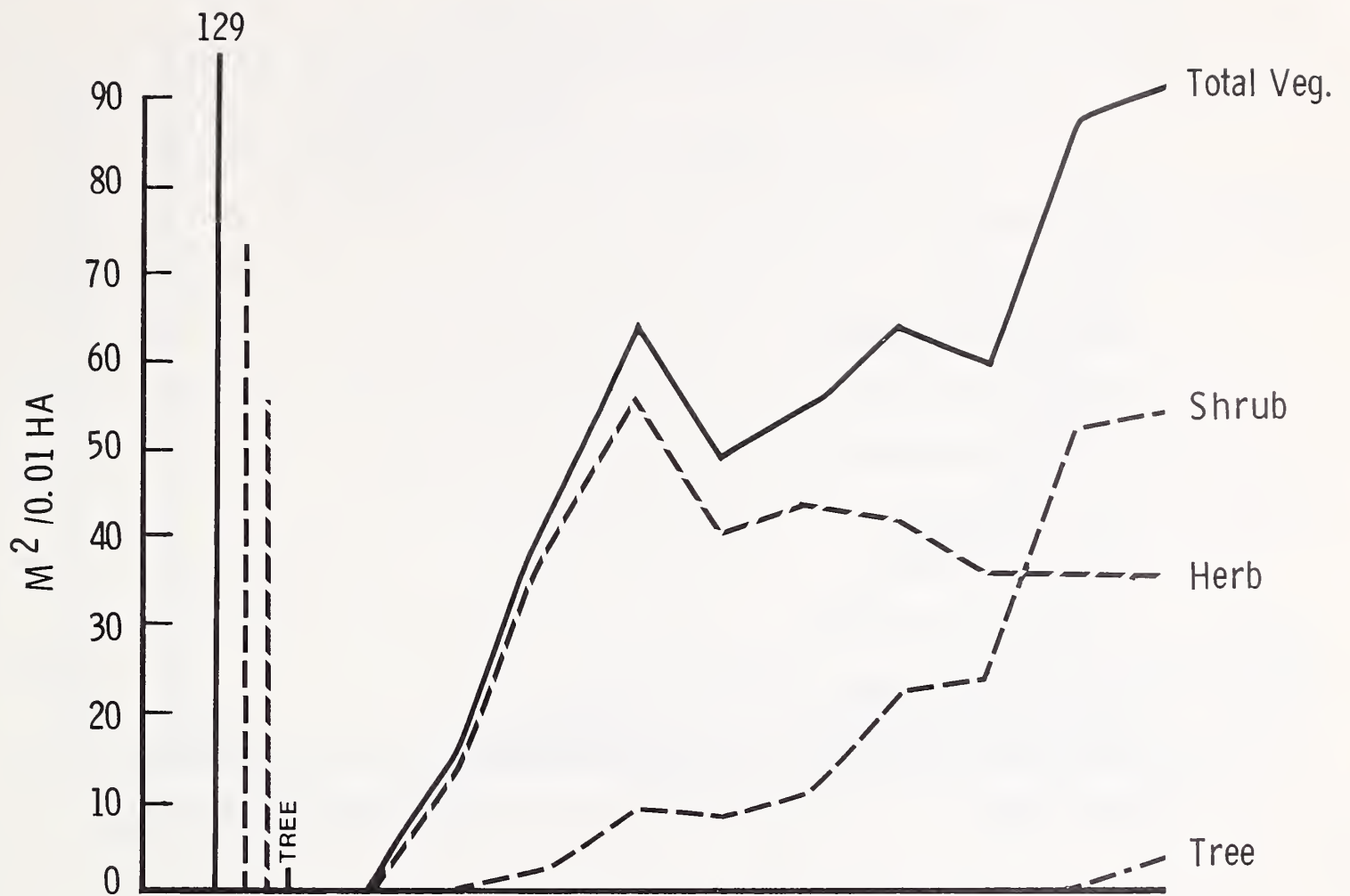


Figure 18-1. Vegetative cover.

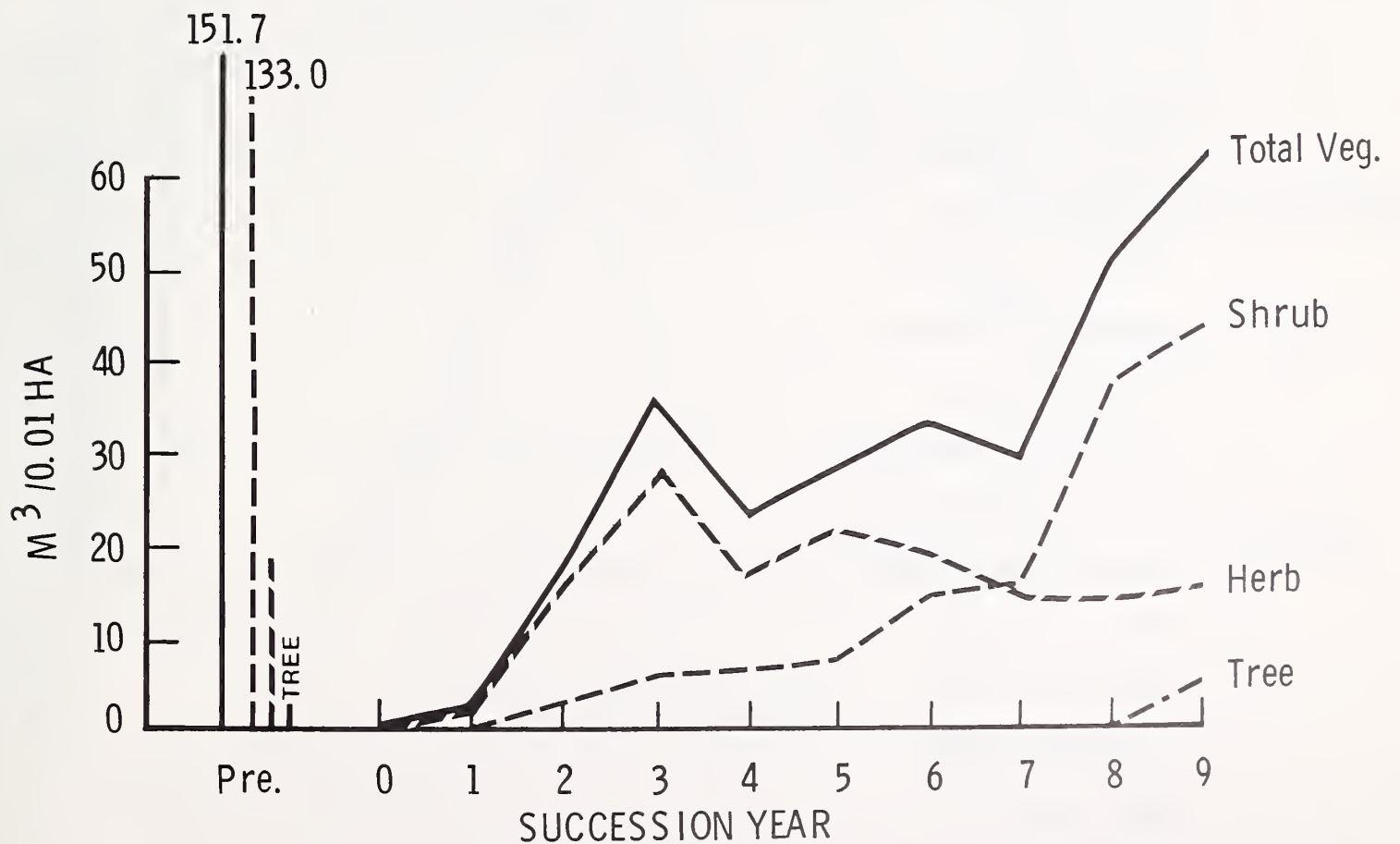


Figure 18-2. Vegetative volume.

MC: S-12 (A-22-3)

Table 18-3.--Cover development of shrub component
(m²/0.01 ha or %), fig. 18-3.

Species	Succession year										
	Pre	1	2	3	4	5	6	7	8	9	
Acer glabrum	16	-	1	2	3	3	2	3	3	3	
Alnus sinuata	14	-	-	-	-	-	-	-	-	-	
Amelanchier alnifolia	1	-	-	-	-	-	-	-	-	1	
Ceanothus velutinus	-	-	-	1	-	-	7	9	25	26	
Pachistima myrsinites	-	-	-	-	-	-	-	1	-	1	
Rosa gymnocarpa	11	-	1	1	2	2	2	2	8	5	
Salix scouleriana	-	-	-	-	-	-	3	3	5	10	
Spiraea betulifolia	5	-	1	4	2	5	7	6	11	7	
Symphoricarpos albus	1	-	-	-	-	-	-	-	-	-	
Vaccinium globulare	26	-	-	-	2	1	1	1	1	2	
Total shrubs	73	-	2	8	8	11	22	24	52	54	

Table 18-4.--Cover development of herb component
(m²/0.01 ha or %), fig. 18-4.

Species	Succession year										
	Pre	1	2	3	4	5	6	7	8	9	
Anaphalis margaritaceae	-	-	-	-	-	-	4	3	5	3	
Arnica latifolia	14	2	1	1	1	-	-	-	-	-	
Berberis repens	2	-	-	1	1	1	2	2	2	1	
Chimaphila umbellata	3	-	-	-	-	-	-	-	-	-	
Cirsium vulgare	-	-	-	-	-	-	-	1	1	-	
Epilobium angustifolium	-	12	34	46	36	37	28	23	21	22	
Epilobium paniculatum	-	-	-	2	-	-	-	-	-	-	
Gnaphalium viscosum	-	-	-	-	-	-	2	-	-	-	
Pyrola secunda	1	-	-	-	-	-	-	-	-	-	
Viola orbiculata	2	-	-	-	-	-	-	-	-	-	
Xerophyllum tenax	29	-	-	1	1	2	1	2	2	2	
Misc. herbs	2	1	3	4	2	4	3	4	5	6	
Total herbs	54	15	38	55	40	43	41	35	35	35	

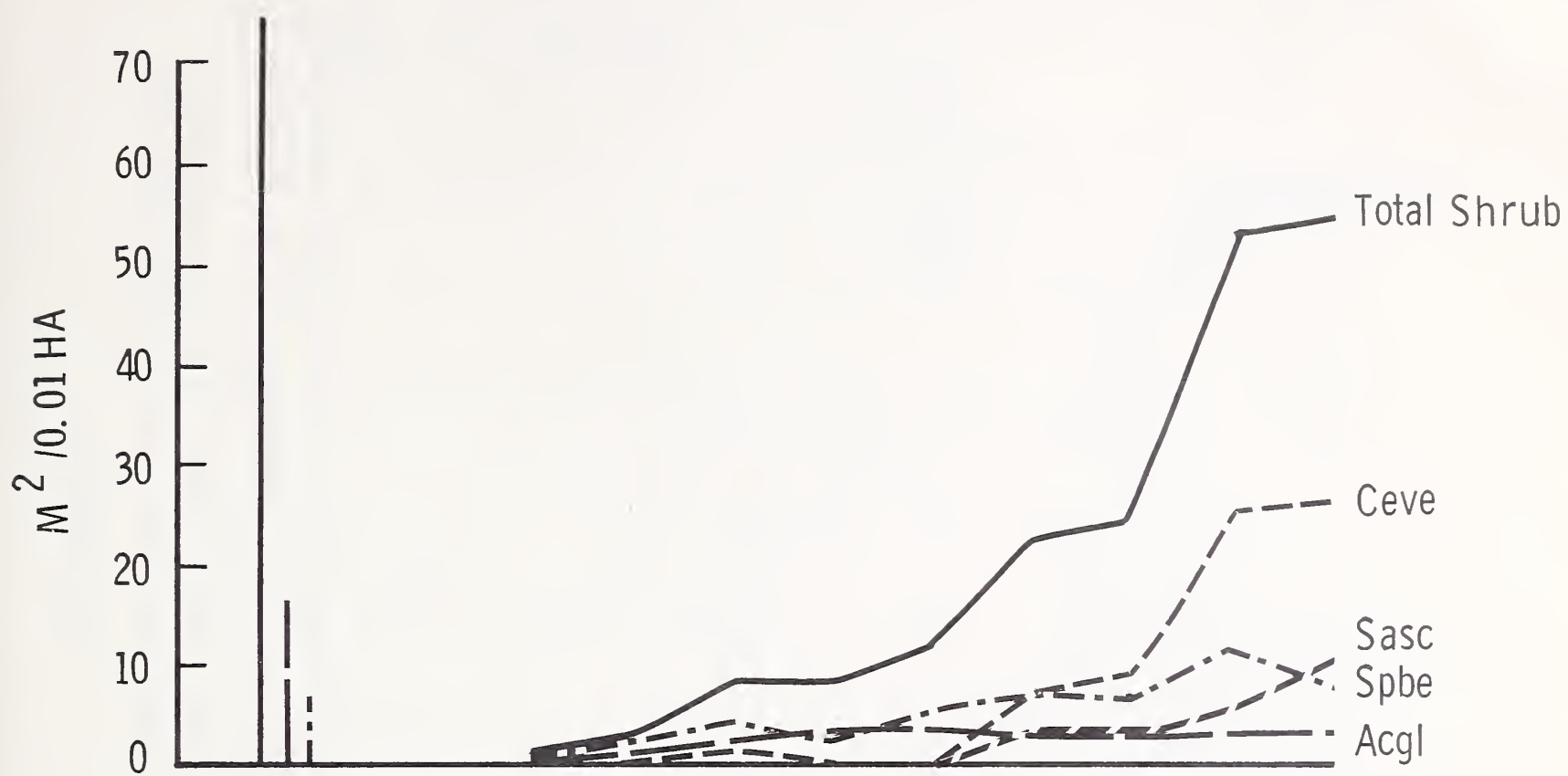


Figure 18-3. Shrub cover.

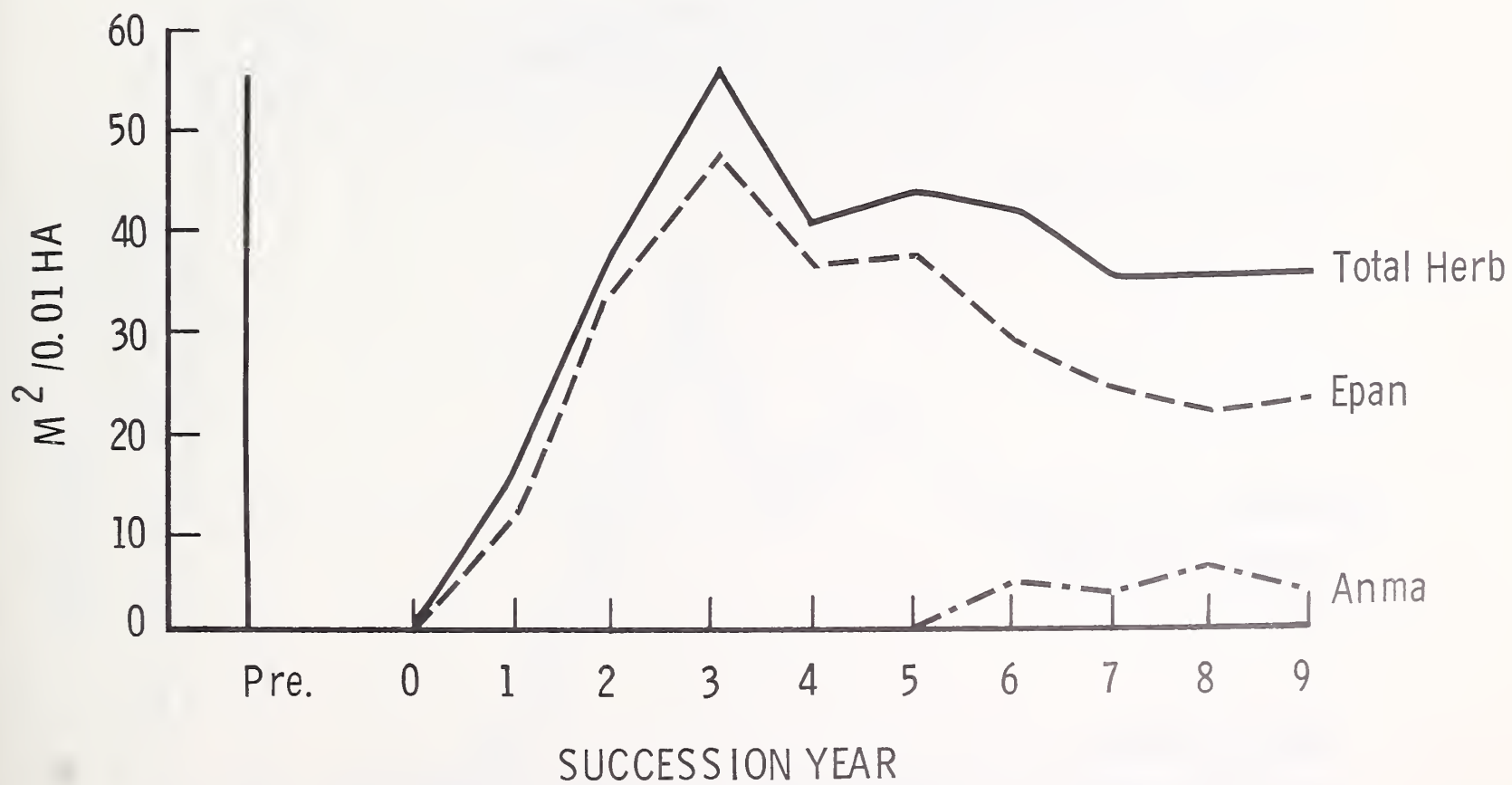


Figure 18-4. Herb cover.

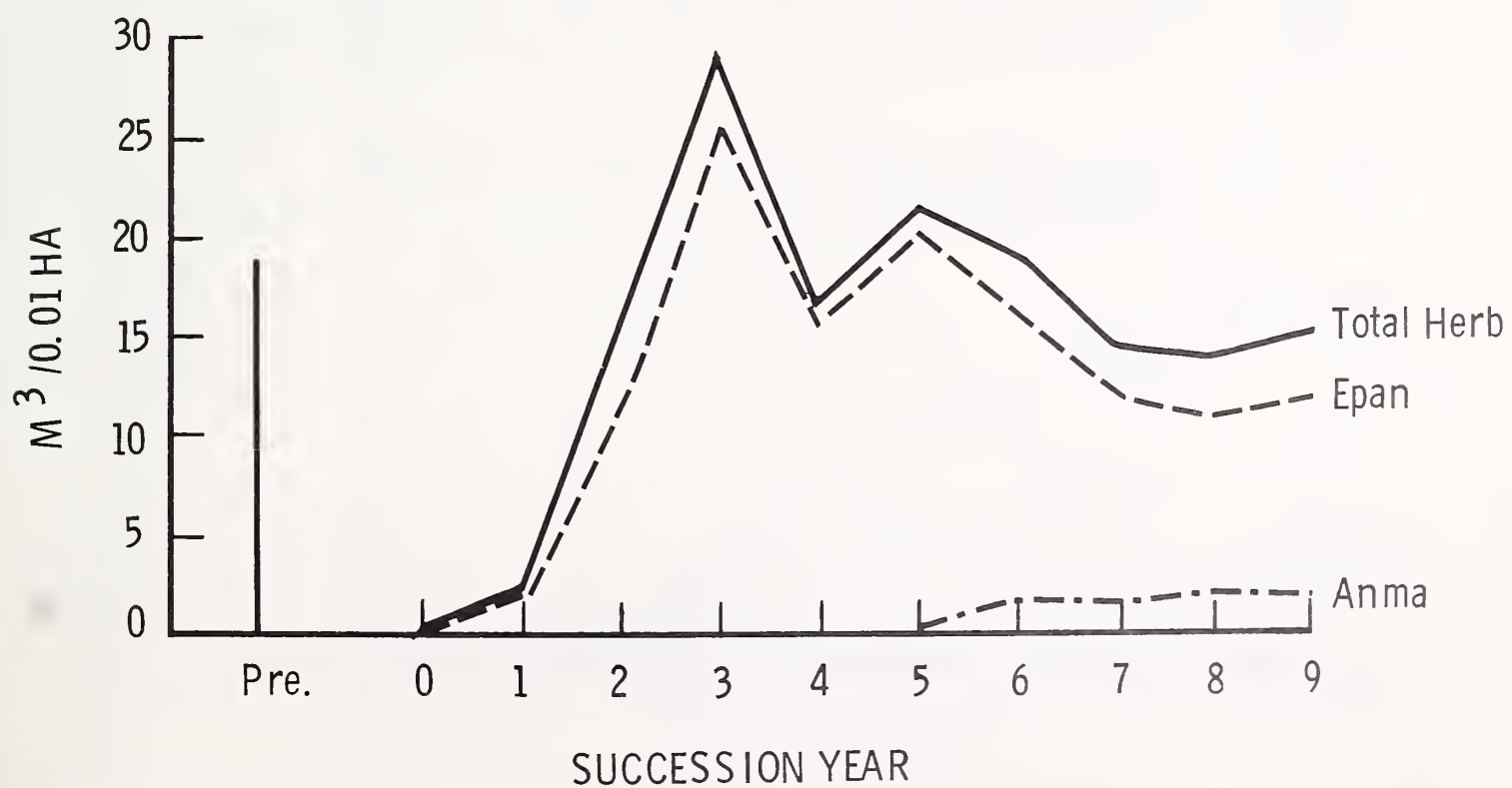
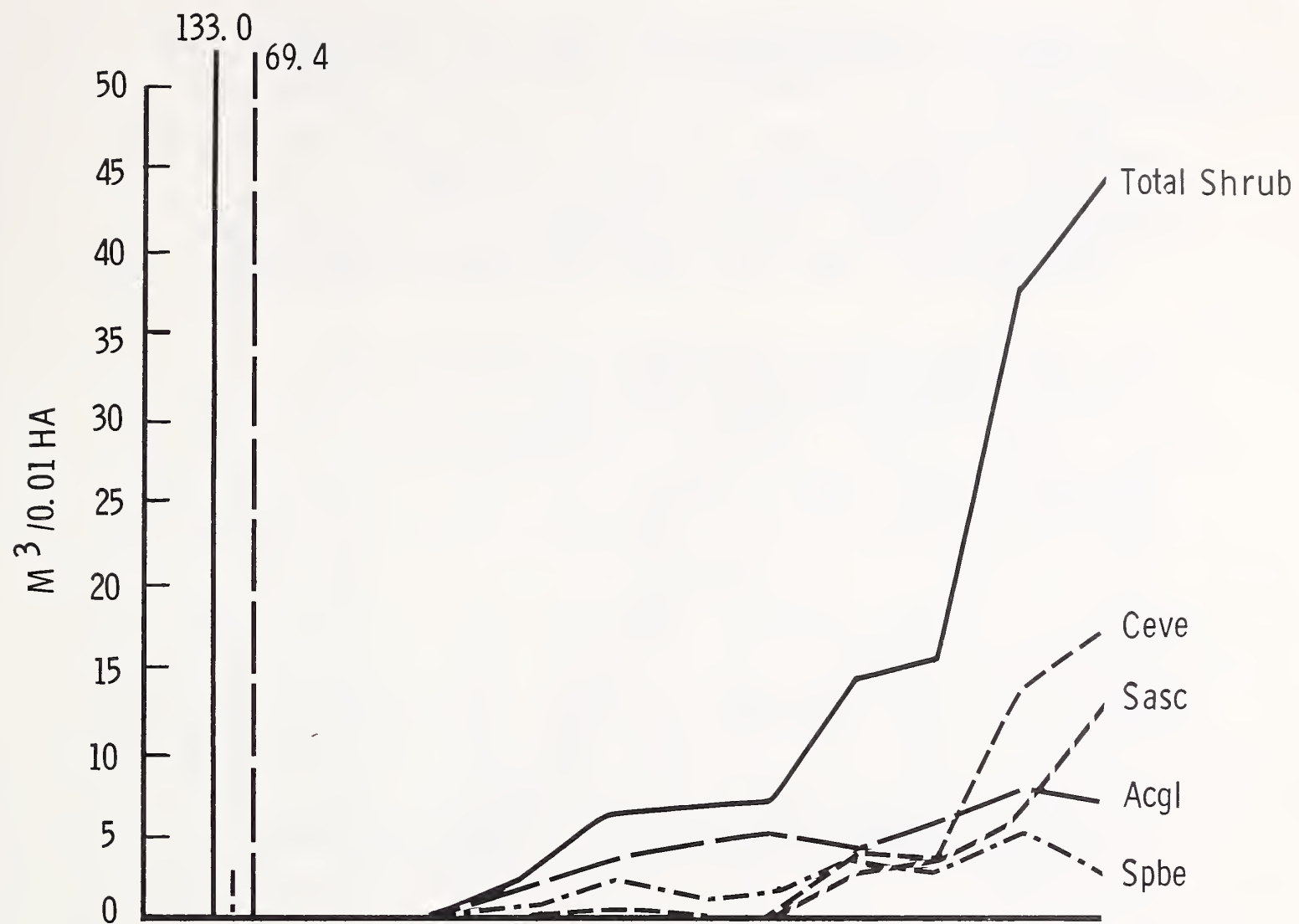
MC: S-12 (A-22-3)

Table 18-5.--Volume development of shrub component (m³/0.01 ha), fig. 18-5.

Species	Succession year																		
	Pre	:	1	:	2	:	3	:	4	:	5	:	6	:	7	:	8	:	9
Acer glabrum	69.4		-		1.8		3.4		4.7		4.9		3.6		5.3		7.7		7.1
Alnus sinuata	40.5		-		-		-		-		-		-		-		-		-
Amelanchier alnifolia	.8		-		-		-		-		-		-		-		-		.8
Ceanothus velutinus	-		-		-		.1		-		-		3.4		3.5		13.3		17.2
Pachistima myrsinites	-		-		-		-		-		-		-		.2		-		.2
Rosa gymnocarpa	6.0		-		.1		.5		.6		.8		1.5		.4		5.2		3.2
Salix scouleriana	-		-		-		-		-		-		2.4		3.2		6.4		12.9
Spiraea betulifolia	1.9		-		.3		2.1		.8		1.1		3.2		2.5		5.1		2.4
Symphoricarpos albus	.2		-		-		-		-		-		-		-		-		-
Vaccinium globulare	14.2		-		-		-		.3		.1		.1		.2		.1		.3
Total shrubs	133.0		-		2.2		6.0		6.3		6.9		14.2		15.3		37.8		44.1

Table 18-6.--Volume development of herb component (m³/0.01 ha), fig. 18-6.

Species	Succession year																		
	Pre	:	1	:	2	:	3	:	4	:	5	:	6	:	7	:	8	:	9
Anaphalis margaritaceae	-		-		-		-		-		-		1.1		1.1		1.5		1.1
Arnica latifolia	2.5		0.1		0.2		0.1		0.1		-		-		-		-		-
Berberis repens	5.4		-		-		<.1		.1		0.1		.3		.2		.2		<.1
Chimaphila umbellata	.4		-		-		-		-		-		-		-		-		-
Cirsium vulgare	-		-		-		-		-		-		-		.1		.2		-
Epilobium angustifolium	-		1.4		13.5		26.1		15.6		20.0		15.4		11.4		10.5		11.4
Epilobium paniculatum	-		-		-		.5		-		-		-		-		-		-
Gnaphalium viscosum	-		-		-		-		-		-		.5		-		-		-
Pyrola secunda	.1		-		-		-		-		-		-		-		-		-
Viola orbiculata	.1		-		-		-		-		-		-		-		-		-
Xerophyllum tenax	9.0		-		-		.2		.2		.4		.2		.5		.4		.7
Misc. herbs	.4		<.1		.8		.4		.2		.5		.7		.6		.8		1.2
Total herbs	17.9		1.5		14.6		27.4		16.1		20.9		18.3		13.9		13.7		14.4



MILLER CREEK: South-13 (1802-13 Area 22-1)

Site location and description: SE $\frac{1}{4}$ NE $\frac{1}{4}$ Sec. 20, T32N R24W MPM.

Elevation: 4,600 ft; Exposure: South (Az. 200°); Slope: 30%

Habitat type: *Abies lasiocarpa*/*Clintonia uniflora*, *Xerophyllum tenax* Phase

Predisturbance forest stand: Pien 30%, Laoc 22%, Abia 21%, Psme 20%, Pico 7% (Stand basal area: 2,491 cm²/0.01 ha)

Disturbance treatment: Unlogged; Wildfire: August 23, 1967

(Succession year 1:1968); Fire intensity: -- g water loss;

Duff moisture: Upper 24%, lower 56%; Postfire duff depth: -- cm

Table 19-1.--Successional development of vegetative cover
(m²/0.01 ha or %), fig. 19-1.

Life-form component	Succession year										
	Pre	1	2	3	4	5	6	7	8	9	
Tree	-	-	-	-	2	2	1	2	1	19	
Shrub	80	3	7	10	18	17	27	34	66	55	
Herb	37	2	15	34	37	27	24	25	22	27	
Total veg.	117	5	22	44	56	47	52	61	89	100	
Exposed ground surface:											
Bare ground	-	9	5	4	1	2	-	1	1	-	
Rock	-	2	2	2	2	-	2	1	3	2	
Litter	23	65	36	18	16	17	23	22	17	23	
Moss	2	20	39	33	32	40	34	29	32	26	

Table 19-2.--Successional development of vegetative volume
(m³/0.01 ha), fig. 19-2.

Life-form component	Succession year										
	Pre	1	2	3	4	5	6	7	8	9	
Tree	-	-	-	-	0.4	0.9	0.3	0.5	0.3	28.3	
Shrub	75.0	1.4	4.2	5.6	13.5	14.5	18.4	23.4	44.6	40.4	
Herb	7.1	.2	5.6	12.9	12.6	11.2	9.5	8.2	7.6	11.2	
Total veg.	82.1	1.6	9.9	18.5	26.6	26.6	28.3	32.1	52.5	79.9	

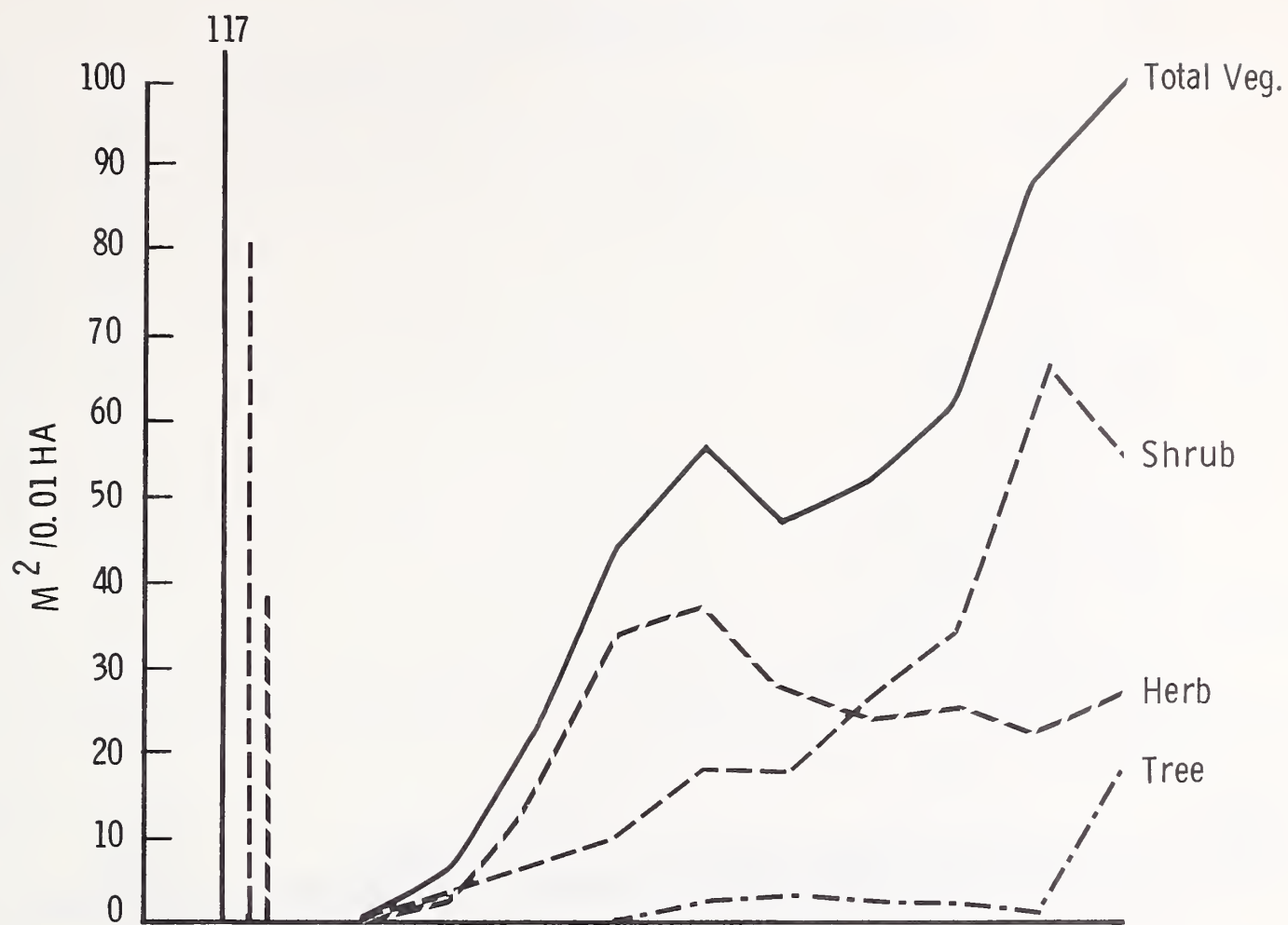


Figure 19-1. Vegetative cover.

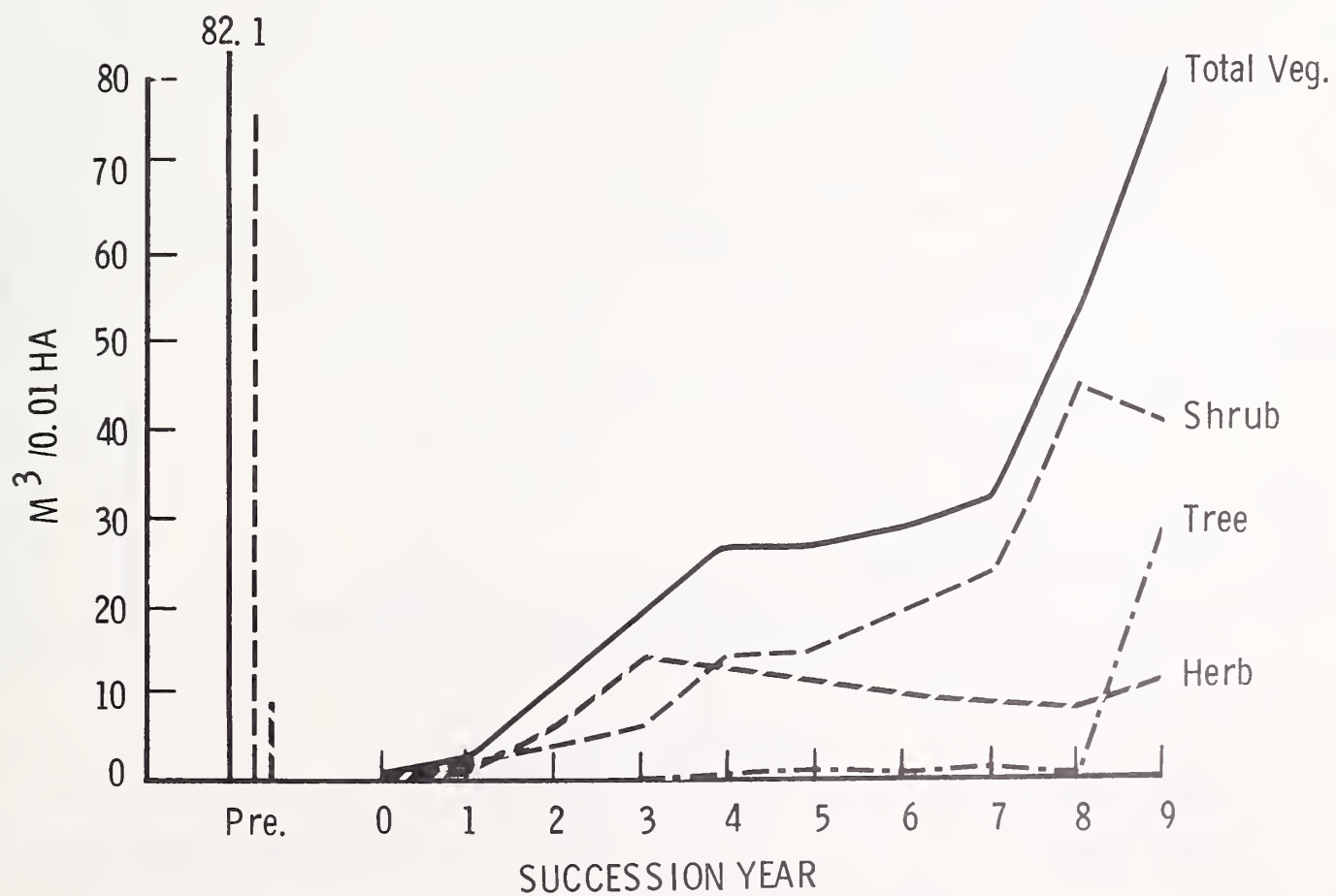


Figure 19-2. Vegetative volume.

MC: S-13 (A-22-1)

Table 19-3.--Cover development of shrub component
(m²/0.01 ha or %), fig. 19-3.

Species	Succession year									
	Pre	1	2	3	4	5	6	7	8	9
<i>Acer glabrum</i>	11	1	2	1	4	4	4	4	6	4
<i>Ceanothus velutinus</i>	-	-	-	2	-	-	5	18	38	29
<i>Rosa gymnocarpa</i>	1	-	1	<1	1	1	1	-	1	<1
<i>Salix scouleriana</i>	-	-	-	-	-	1	1	<1	3	<1
<i>Spiraea betulifolia</i>	9	2	4	7	11	11	15	11	14	16
<i>Vaccinium globulare</i>	54	-	-	1	1	1	1	1	4	6
<i>Vaccinium myrtillus</i>	5	-	-	-	-	-	-	-	-	-
Total shrubs	80	3	7	10	18	17	27	34	66	55

Table 19-4.--Cover development of herb component
(m²/0.01 ha or %), fig. 19-4.

Species	Succession year									
	Pre	1	2	3	4	5	6	7	8	9
<i>Berberis repens</i>	1	-	-	-	-	-	-	-	-	-
<i>Bromus vulgaris</i>	1	-	-	-	-	-	-	-	-	-
<i>Calamagrostis rubescens</i>	-	-	-	1	1	1	1	2	3	6
<i>Carex concinnoides</i>	2	-	-	-	-	1	1	1	-	1
<i>Chimaphila umbellata</i>	4	-	-	-	-	-	-	-	-	-
<i>Epilobium angustifolium</i>	-	-	10	22	26	16	9	7	7	10
<i>Epilobium paniculatum</i>	-	-	-	3	1	-	-	-	-	-
<i>Hieracium albiflorum</i>	1	-	-	-	-	-	-	-	-	-
<i>Linnaea borealis</i>	2	-	-	-	-	-	-	-	-	-
<i>Xerophyllum tenax</i>	23	2	3	2	4	5	8	8	6	9
Misc. herbs	3	-	2	5	5	5	6	8	6	1
Total herbs	37	2	15	34	37	27	24	25	22	27

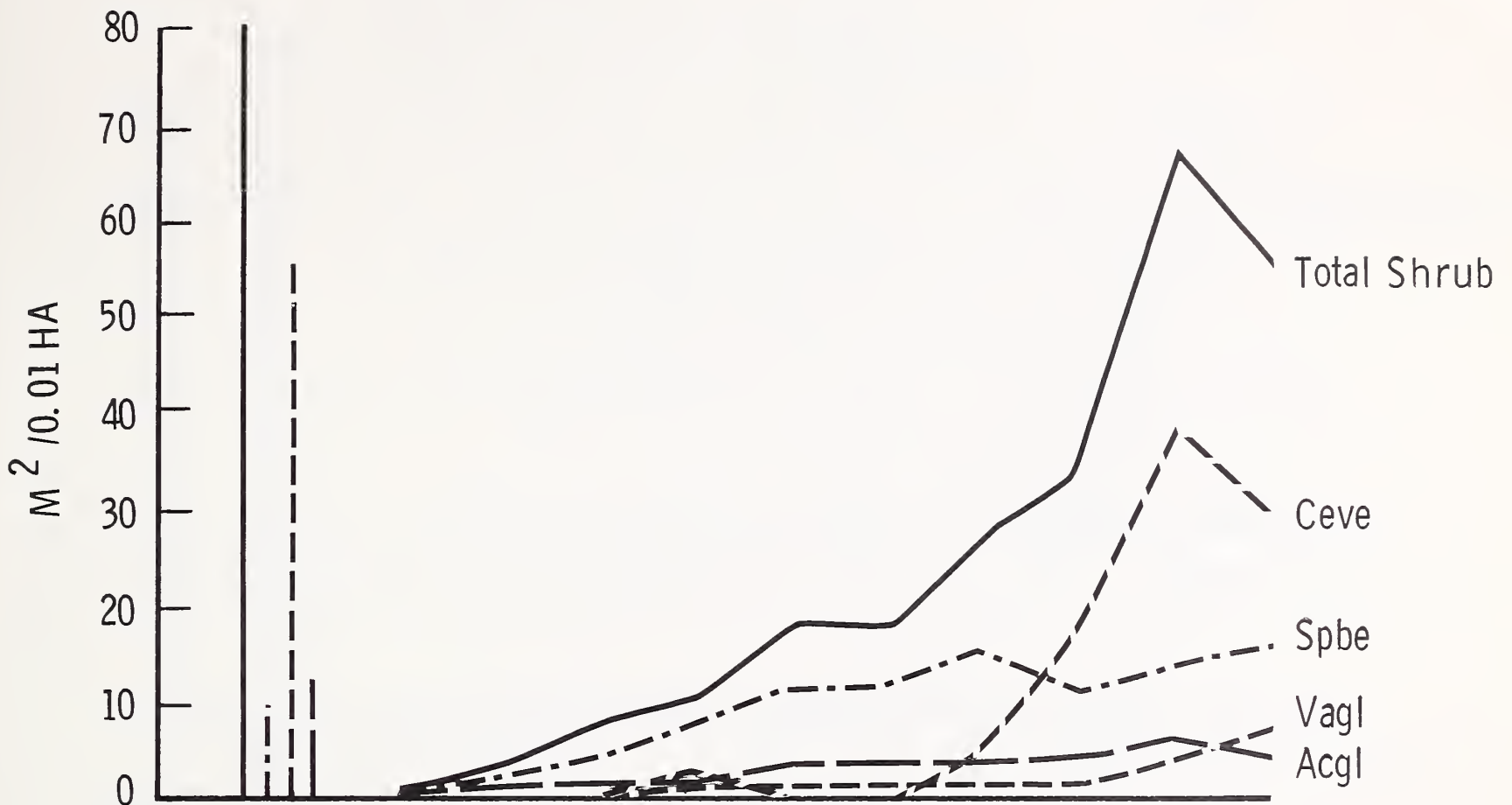


Figure 19-3. Shrub cover.

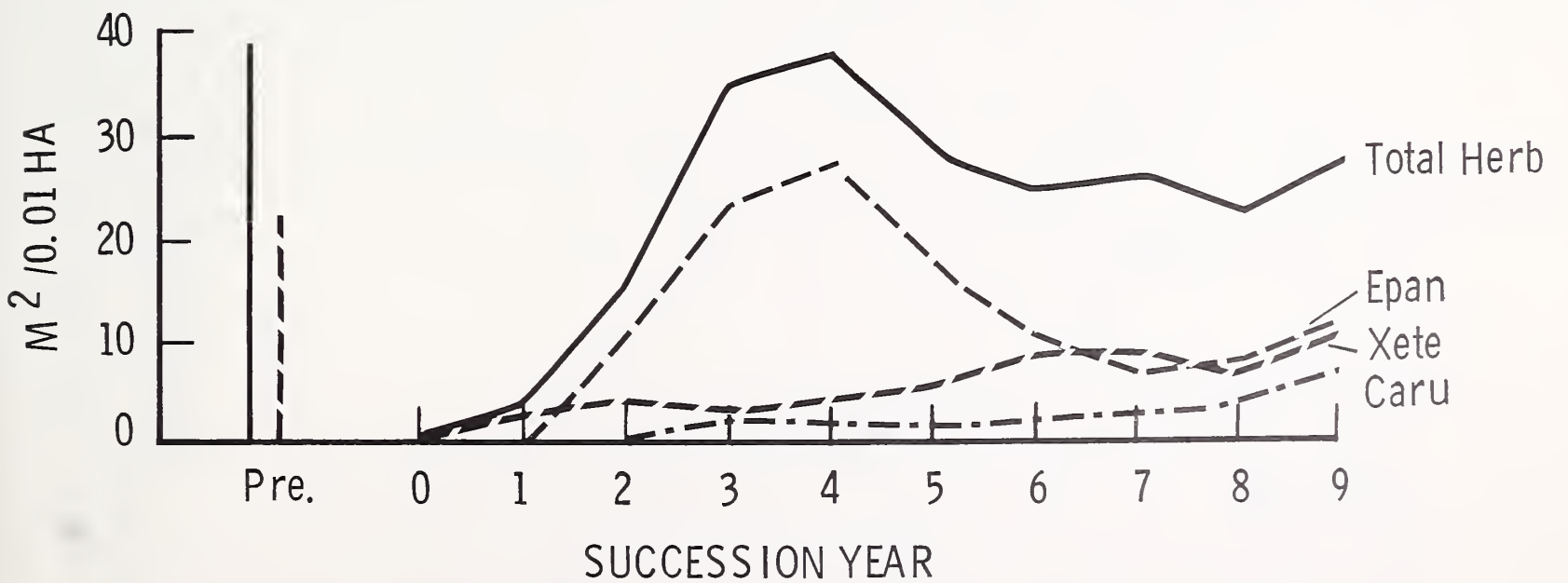


Figure 19-4. Herb cover.

Table 19-5.--Volume development of shrub component ($m^3/0.01$ ha), fig. 19-5.

Species	Succession year										
	Pre	1	2	3	4	5	6	7	8	9	
Acer glabrum	45.0	0.9	2.4	2.5	8.5	9.1	9.6	10.6	12.3	10.5	
Ceanothus velutinus	-	-	-	.2	-	-	1.9	8.6	23.6	23.4	
Rosa gymnocarpa	.6	-	.4	.2	1.0	.6	.4	-	.3	.1	
Salix scouleriana	-	-	-	-	-	.5	.5	.2	2.7	.3	
Spiraea betulifolia	2.3	.5	1.4	2.6	3.9	4.1	5.9	3.9	5.2	5.2	
Vaccinium globulare	26.3	-	-	.1	.1	.1	.1	.1	.6	1.0	
Vaccinium myrtillus	.8	-	-	-	-	-	-	-	-	-	
Total shrubs	75.0	1.4	4.2	5.6	13.5	14.5	18.4	23.4	44.6	40.4	

Table 19-6.--Volume development of herb component ($m^3/0.01$ ha), fig. 19-6.

Species	Succession year										
	Pre	1	2	3	4	5	6	7	8	9	
Berberis repens	0.2	-	-	-	-	-	-	-	-	-	
Bromus vulgaris	.2	-	-	-	-	-	-	-	-	-	
Calamagrostis rubescens	-	-	-	0.3	<0.1	0.2	0.2	0.5	1.0	2.2	
Carex concinnoides	.8	-	-	-	-	<.1	.1	.1	-	.2	
Chimaphila umbellata	.4	-	-	-	-	-	-	-	-	-	
Epilobium angustifolium	-	-	4.4	9.9	10.9	8.8	5.1	3.4	3.7	5.8	
Epilobium paniculatum	-	-	-	.7	<.1	-	-	-	-	-	
Hieracium albiflorum	<.1	-	-	-	-	-	-	-	-	-	
Linnaea borealis	.1	-	-	-	-	-	-	-	-	-	
Xerophyllum tenax	5.8	0.2	.8	.8	.9	1.1	2.4	1.8	1.6	2.8	
Misc. herbs	.3	-	.4	1.3	.8	1.0	1.6	2.4	1.3	.2	
Total herbs	7.1	.2	5.6	12.9	12.6	11.2	9.5	8.2	7.6	11.2	

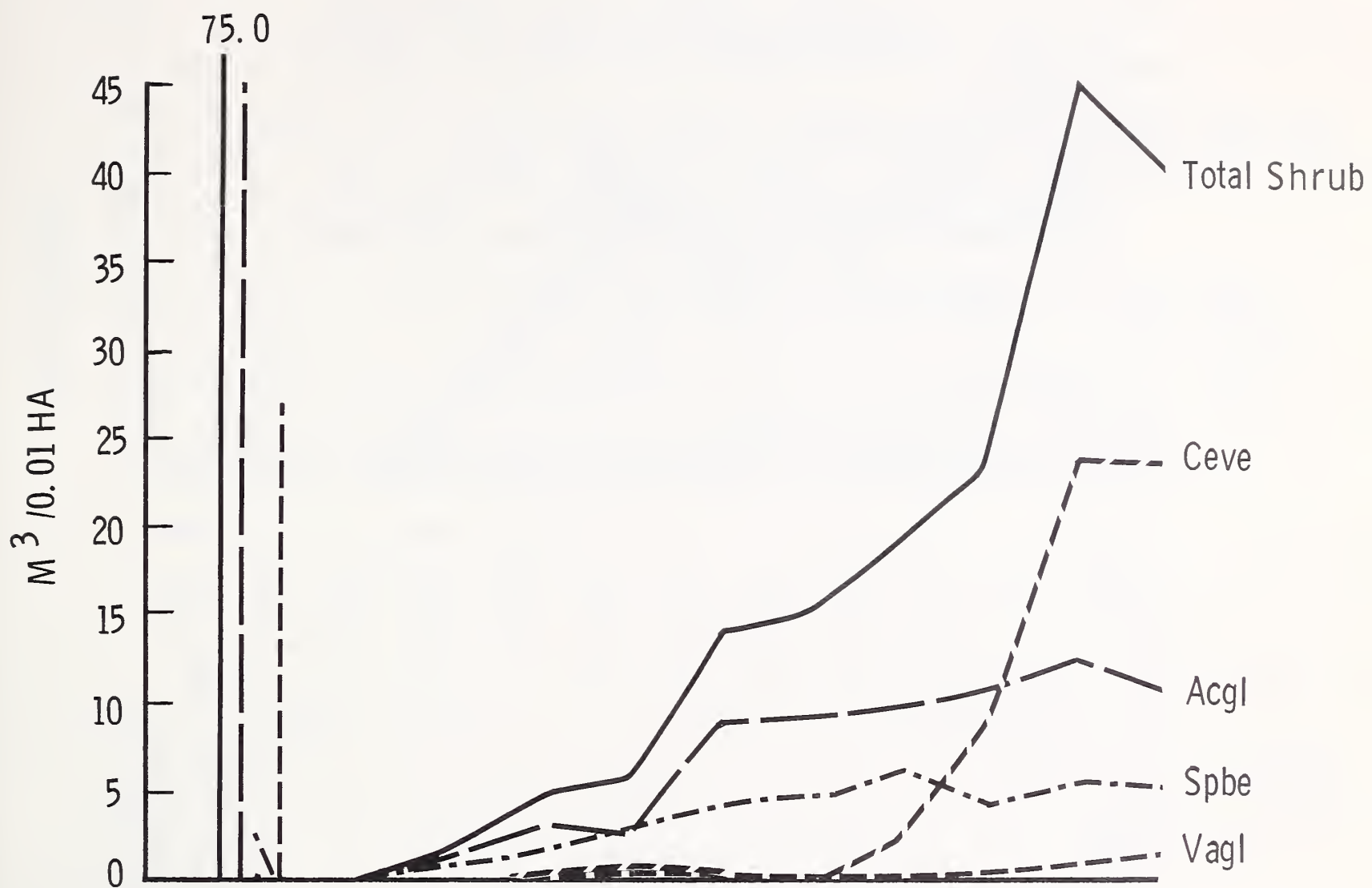


Figure 19-5. Shrub volume.

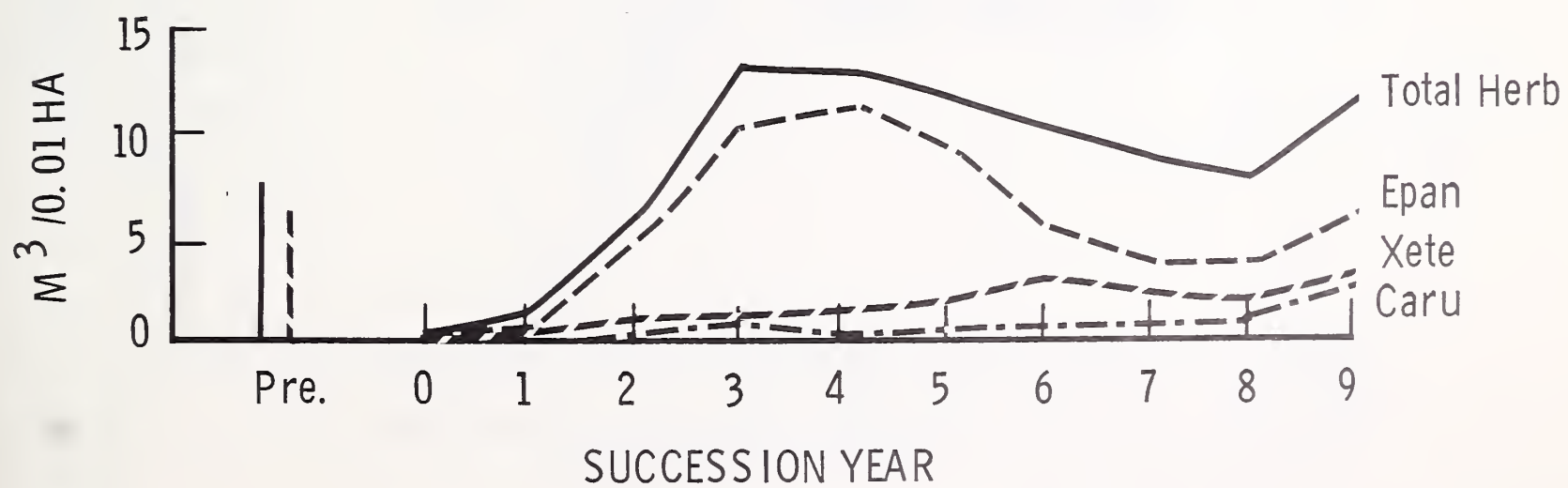


Figure 19-6. Herb volume.

MILLER CREEK: West-6 (1802-13 Area 23)

Site location and description: SW $\frac{1}{4}$ NE $\frac{1}{4}$ Sec. 21, T32N R24W MPM.

Elevation: 4,300 ft; Exposure: West (Az. 255°); Slope: 15%

Habitat type: *Abies lasiocarpa*/*Clintonia uniflora*, *Xerophyllum*
tenax Phase

Predisturbance forest stand: Psme 35%, Abia 33%, Laoc 16%, Pico 15%,
Pien 1% (Stand basal area: 3,788 cm²/0.01 ha)

Disturbance treatment: Unlogged; Wildfire: August 23, 1967

(Succession year 1:1968); Fire intensity: -- g water loss;

Duff moisture: Upper 24%, Lower 56%; Postfire duff depth: -- cm

Table 20-1.--Successional development of vegetative cover
(m²/0.01 ha or %), fig. 20-1.

Life-form component	Succession year										
	Pre	1	2	3	4	5	6	7	8	9	
Tree	-	-	-	-	-	-	1	-	2	13	
Shrub	88	1	2	3	4	10	10	16	25	27	
Herb	47	14	42	51	43	48	43	34	46	36	
Total veg.	135	15	44	54	47	58	55	50	73	75	

Exposed ground surface:

Bare ground	-	1	-	-	-	-	-	-	1	-
Rock	-	-	-	-	-	-	-	-	-	-
Litter	16	79	37	27	28	27	32	31	14	22
Moss	3	5	20	20	24	17	16	21	22	20

Table 20-2.--Successional development of vegetative volume
(m³/0.01 ha), fig. 20-2.

Life-form component	Succession year										
	Pre	1	2	3	4	5	6	7	8	9	
Tree	-	-	-	-	-	-	0.2	-	0.5	8.6	
Shrub	75.2	0.2	0.4	1.1	1.4	3.4	3.9	5.2	12.0	11.9	
Herb	10.5	1.2	13.7	20.2	15.3	18.0	14.3	9.6	14.0	10.9	
Total veg.	85.7	1.3	14.2	21.2	16.7	21.4	18.5	14.8	26.5	31.5	

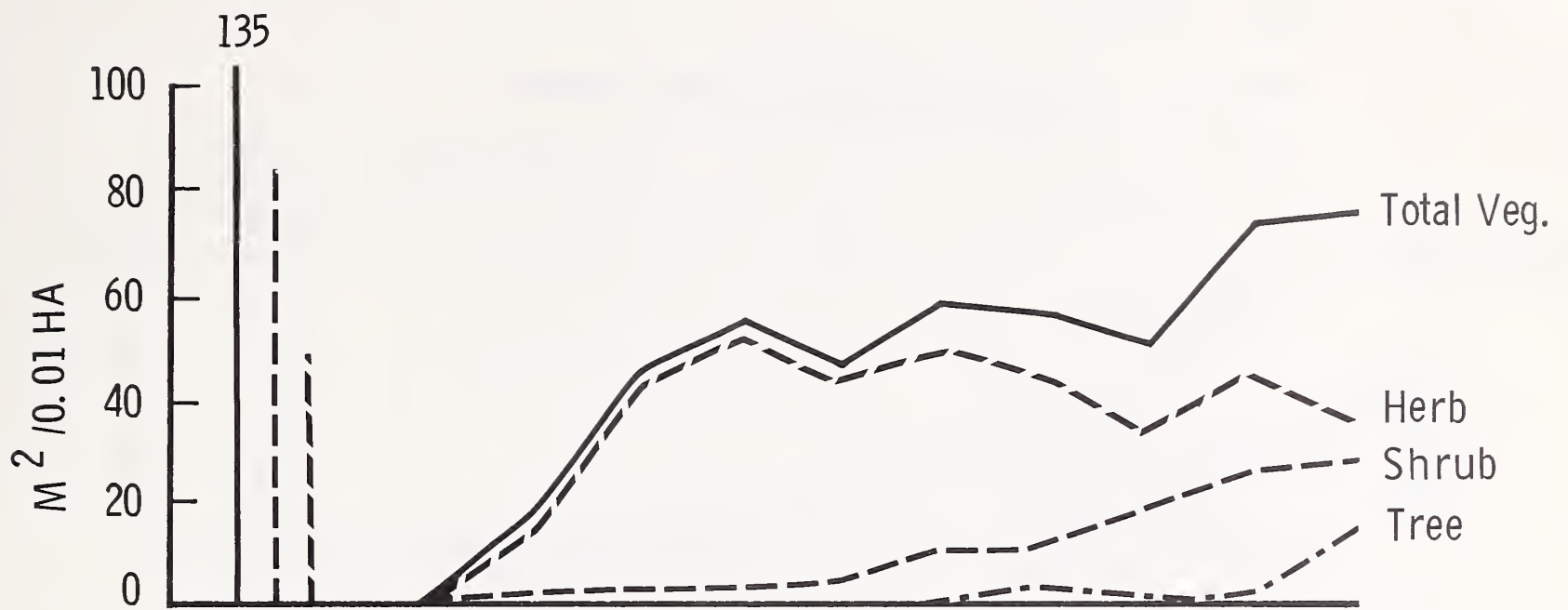


Figure 20-1. Vegetative cover.

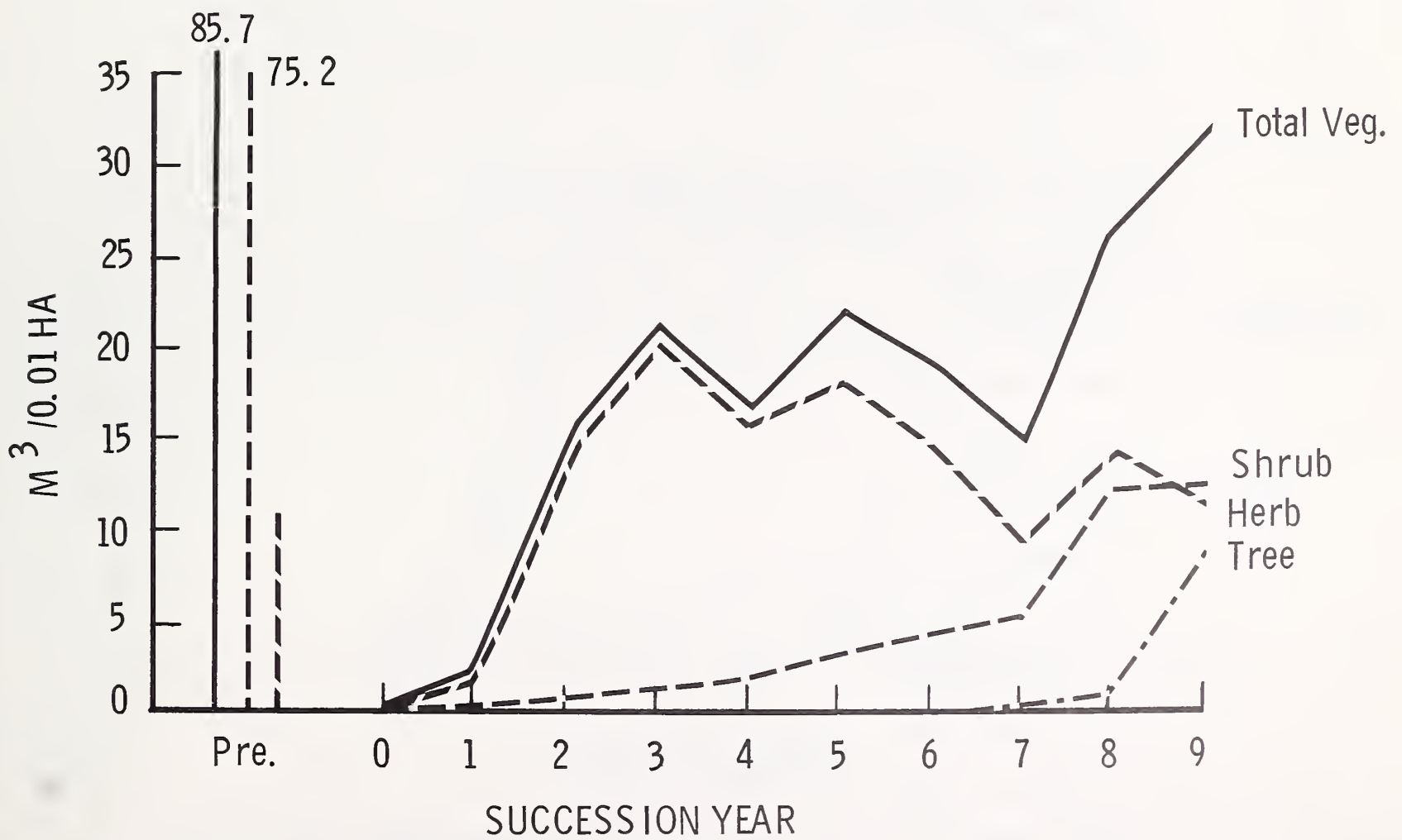


Figure 20-2. Vegetative volume.

MC: W-6 (A-23)

Table 20-3.--Cover development of shrub component
(m²/0.01 ha or %), fig. 20-3.

Species	Succession year										
	Pre	1	2	3	4	5	6	7	8	9	
Acer glabrum	8	<1	-	-	-	-	-	-	1	<1	
Lonicera utahensis	4	-	-	-	1	2	-	2	-	-	
Pachistima myrsinites	2	-	-	-	-	-	-	-	-	-	
Rosa gymnocarpa	2	-	<1	1	-	2	1	2	4	2	
Salix scouleriana	-	-	2	-	-	2	2	3	9	10	
Shepherdia canadensis	16	-	-	-	-	-	-	-	-	-	
Spiraea betulifolia	9	1	-	2	3	5	5	8	9	11	
Taxus brevifolia	8	-	-	-	-	-	-	-	-	-	
Vaccinium globulare	40	-	-	-	-	-	2	1	2	3	
Total shrubs	88	1	2	3	4	10	10	16	25	27	

Table 20-4.--Cover development of herb component
(m²/0.01 ha or %), fig. 20-4.

Species	Succession year									
	Pre	1	2	3	4	5	6	7	8	9
Arnica latifolia	2	1	-	2	2	1	2	-	1	-
Aster conspicuus	-	-	-	-	-	-	-	-	1	-
Carex concinnoides	-	-	-	-	-	-	-	-	1	-
Chimaphila umbellata	1	-	-	-	-	-	-	-	-	-
Epilobium angustifolium	-	9	37	42	31	37	26	20	19	18
Linnaea borealis	5	-	-	-	-	-	1	-	2	1
Pyrola uniflora	1	-	-	-	-	-	-	-	-	-
Xerophyllum tenax	32	3	2	4	8	6	7	8	13	10
Misc. herbs	7	1	2	3	2	5	8	7	9	7
Total herbs	47	14	42	51	43	48	43	34	46	36



Figure 20-3. Shrub cover.

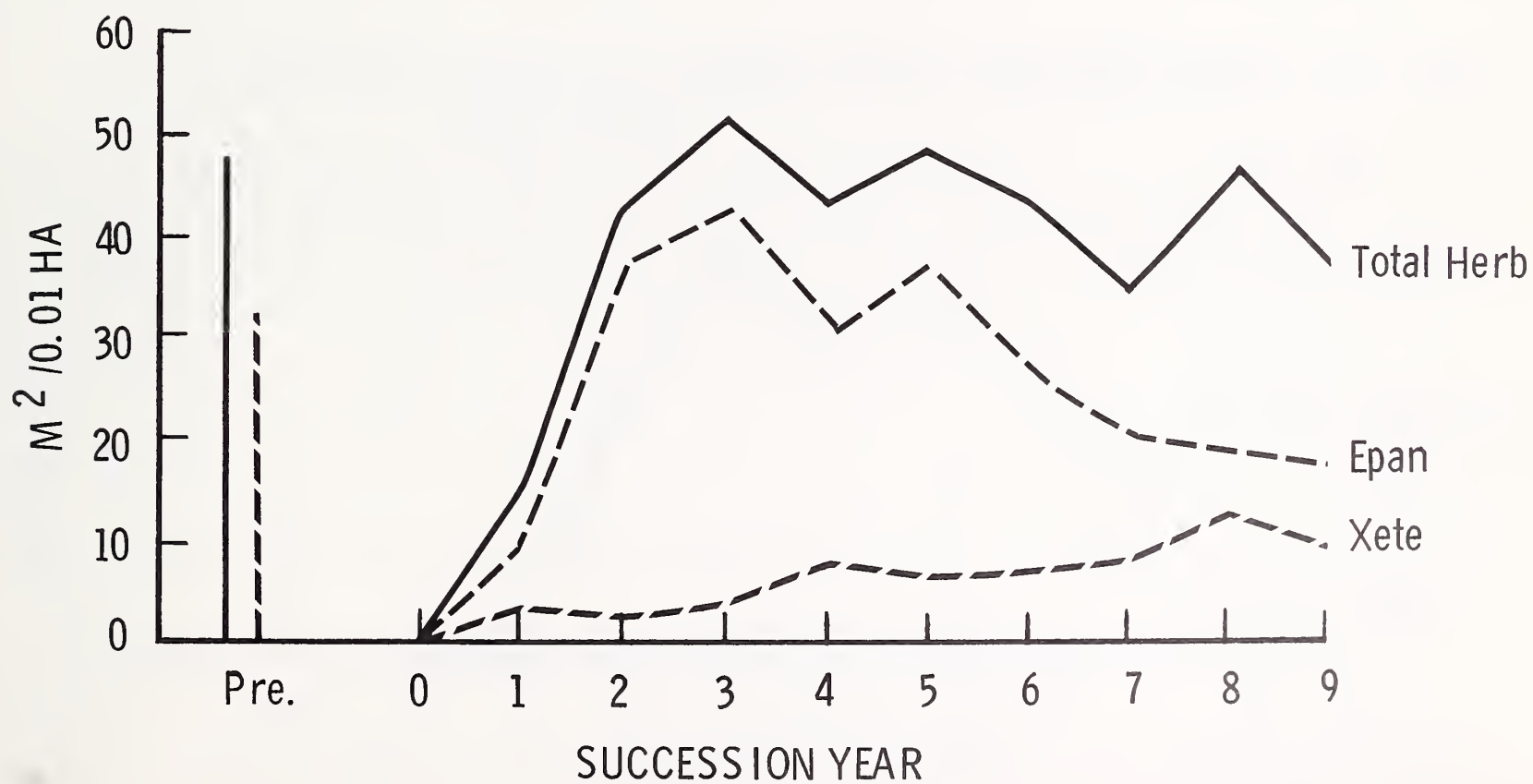


Figure 20-4. Herb cover.

Table 20-5.--Volume development of shrub component ($m^3/0.01$ ha), fig. 20-5.

Species	Succession year									
	Pre	: 1	: 2	: 3	: 4	: 5	: 6	: 7	: 8	: 9
<i>Acer glabrum</i>	16.9	0.1	-	-	-	-	-	-	0.5	0.2
<i>Lonicera utahensis</i>	1.7	-	-	-	0.4	0.7	-	0.4	-	-
<i>Pachistima myrsinites</i>	.2	-	-	-	-	-	-	-	-	-
<i>Rosa gymnocarpa</i>	1.3	-	0.1	0.3	-	.8	0.8	.6	.9	.8
<i>Salix scouleriana</i>	-	-	.3	-	-	.6	1.4	1.8	6.6	7.4
<i>Shepherdia canadensis</i>	15.2	-	-	-	-	-	-	-	-	-
<i>Spiraea betulifolia</i>	3.0	.1	-	.8	1.0	1.4	1.5	2.2	3.4	3.1
<i>Taxus brevifolia</i>	16.0	-	-	-	-	-	-	-	-	-
<i>Vaccinium globulare</i>	20.9	-	-	-	-	-	.2	.2	.6	.4
Total shrubs	75.2	.2	.4	1.1	1.4	3.4	3.9	5.2	12.0	11.9

Table 20-6.--Volume development of herb component ($m^3/0.01$ ha), fig. 20-6.

Species	Succession year									
	Pre	: 1	: 2	: 3	: 4	: 5	: 6	: 7	: 8	: 9
<i>Arnica latifolia</i>	0.3	<0.1	-	0.2	0.1	<0.1	0.1	-	0.1	-
<i>Aster conspicuus</i>	-	-	-	-	-	-	-	-	.4	-
<i>Carex concinnoides</i>	-	-	-	-	-	-	-	-	.1	-
<i>Chimaphila umbellata</i>	.1	-	-	-	-	-	-	-	-	-
<i>Epilobium angustifolium</i>	-	.7	13.1	18.3	13.1	16.0	11.1	7.2	9.0	8.0
<i>Linnaea borealis</i>	.2	-	-	-	-	-	<.1	-	.2	<.1
<i>Pyrola uniflora</i>	<.1	-	-	-	-	-	-	-	-	-
<i>Xerophyllum tenax</i>	9.0	.4	.3	1.0	1.7	1.2	1.5	1.4	2.5	2.2
Misc. herbs	.9	<.1	.3	.6	.4	.8	1.5	1.0	1.8	.7
Total herbs	10.5	1.2	13.7	20.2	15.3	18.0	14.3	9.6	14.0	10.9



Figure 20-5. Shrub volume.

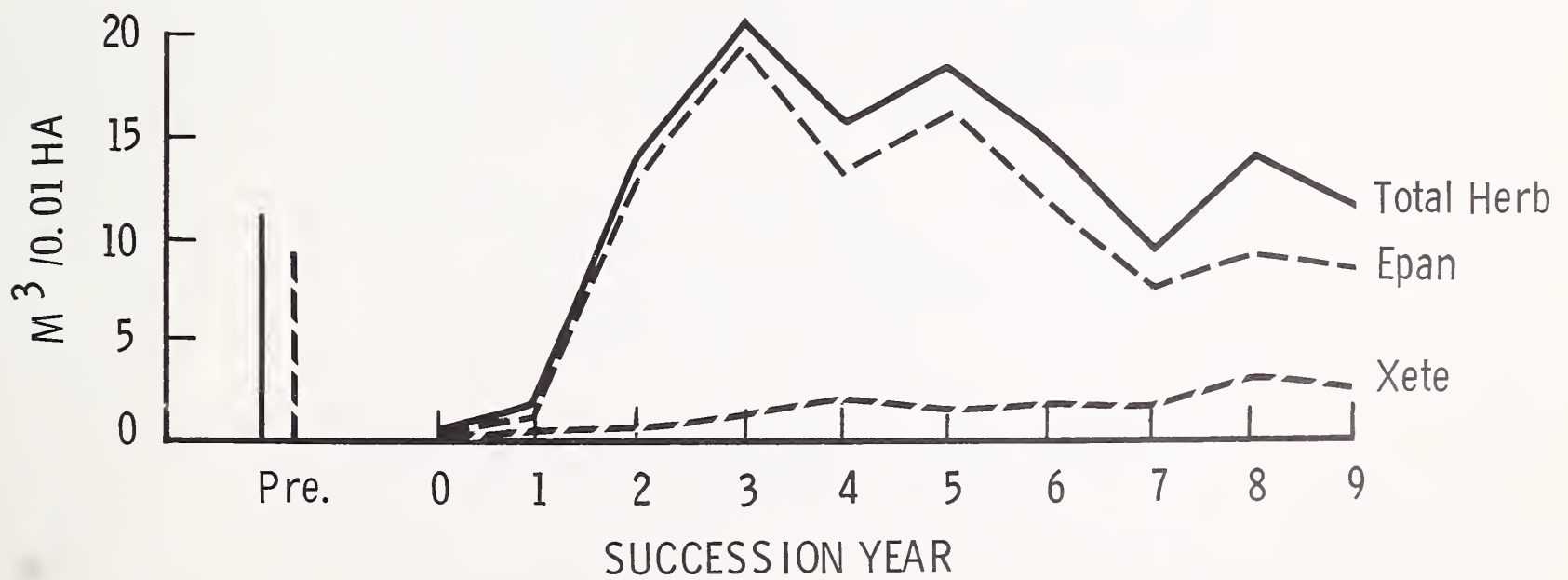


Figure 20-6. Herb volume.

Stickney, Peter F.

1980. Data base for post-fire succession, first 6 to 9 years, in Montana larch-fir forests. USDA For. Serv. Gen. Tech. Rep. INT-62, 133 p. Intermountain Forest and Range Experiment Station, Ogden, Utah 84401.

Provides base line data on cover and volume development of plant species and life forms in the initial 6 to 9 years following disturbance by clearcut logging and fire or wild-fire in Montana's western larch-Douglas-fir forest type. Successional data is presented in basic form (m^2 or $m^3/0.01$ ha) for analytical use by others in modeling forest development and other forest management applications.

KEYWORDS: forest succession, fire succession, secondary plant succession, successional data base, initial successional stages, western larch type, Douglas-fir type.

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The Intermountain Station, headquartered in Ogden, Utah, is one of eight regional experiment stations charged with providing scientific knowledge to help resource managers meet human needs and protect forest and range ecosystems.

The Intermountain Station includes the States of Montana, Idaho, Utah, Nevada, and western Wyoming. About 231 million acres, or 85 percent, of the land area in the Station territory are classified as forest and rangeland. These lands include grasslands, deserts, shrublands, alpine areas, and well-stocked forests. They supply fiber for forest industries; minerals for energy and industrial development; and water for domestic and industrial consumption. They also provide recreation opportunities for millions of visitors each year.

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